JANUARY 16, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

# Metal Fatigue

## ...what you can do about it...page 68

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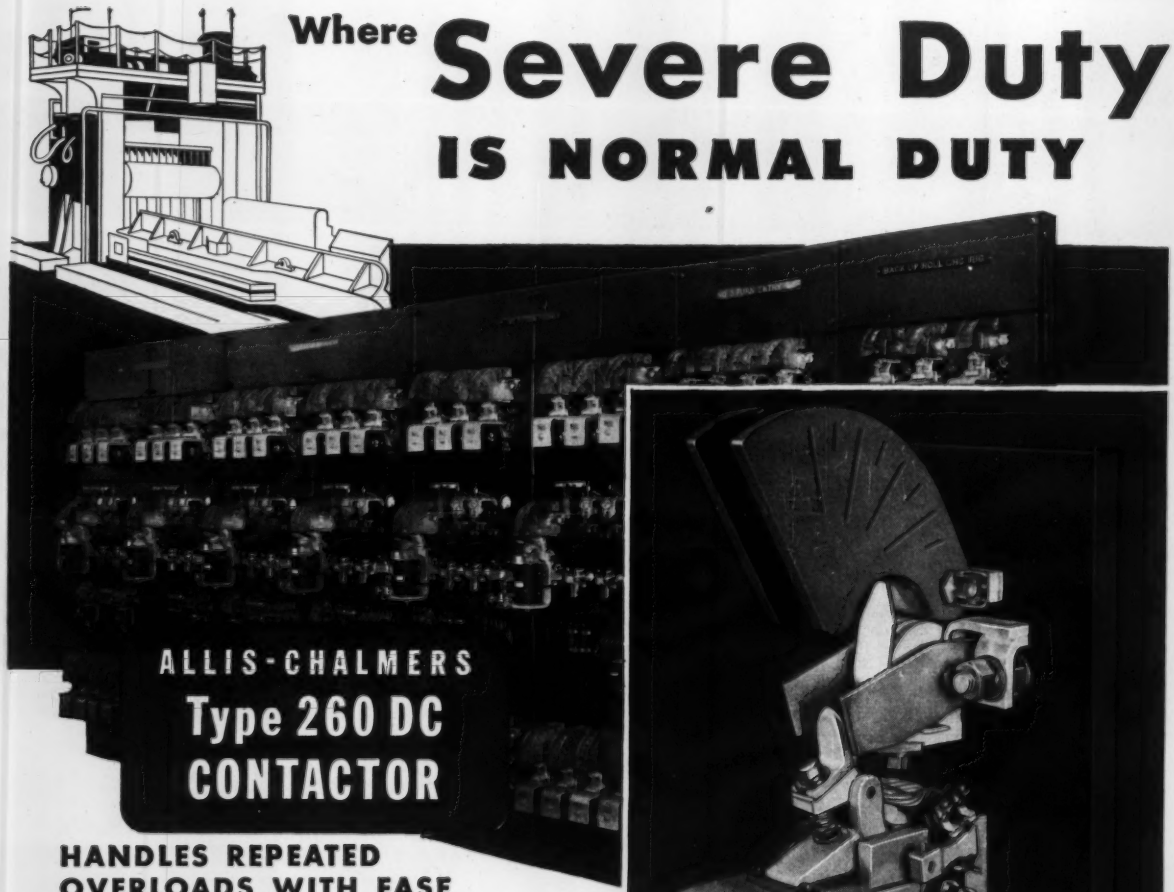
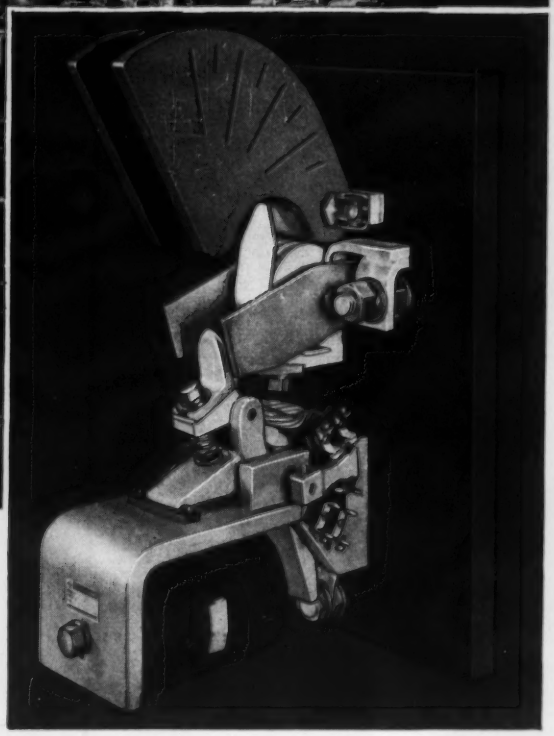
# Where Severe Duty IS NORMAL DUTY



ALLIS-CHALMERS
Type 260 DC
CONTACTOR



## HANDLES REPEATED OVERLOADS WITH EASE

Extra overload capacity . . . extra durability and reliability have been built into this heavy duty contactor — to make your roughest dc drive a smooth running, precision operation . . . to assure maximum production and quality with a minimum of outage time and maintenance. Principal component on the Allis-Chalmers constant potential panel, the Type 260 dc contactor is a rugged unit engineered to withstand punishing current surges inherent in steel mill auxiliary drive operation.

## *Here's Why!*

● **Quick quenching minimizes contact burning** — Arc centering blowout uses thermal convection and magnetic action to stretch, cool and extinguish arc. Rapid circuit interruption minimizes burning and pitting of contacts.

● **All current-carrying parts silver to silver** — Main contacts are high density forged copper, plated with silver for dependability and extended life. Auxiliary contacts are solid silver . . . need no dressing.

● **Magnet coil designed for continuous duty at 110% of rating** — Coil layer wound with insulation between layers . . . vacuum impregnated to resist moisture and abuse. Operates contactor at less than 80% of rated voltage when hot. Holds at 20% of normal voltage.

● **Other features.** Rolling contact action. Arc handled on tips, current on clean heels . . . no destructive scuffing. Design simplicity eliminates troublesome linkages, arms and pivots. Lifetime *Oilite* shaft bearings need no lubrication. A-4326

## SIMPLIFIED ROUTINE INSPECTION

**Keeping the Type 260 contactor in top operating condition is merely a matter of preventive maintenance through routine inspection. All components are readily accessible. Arc chute lifts off to expose contacts which may be removed by loosening one bolt. Auxiliary contacts are mounted on contactor frame in full view. Operating coil is held by a single bolt.**

*For complete information, call your nearby Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.*

# ALLIS-CHALMERS

# Three Forgings That Support the Globe

In Greek mythology, Atlas was charged with the job of holding up the heavens, but right here in our own day and age is a "world" supported by forgings. It is a huge and wondrous globe that stands on the campus of Babson Institute of Business Administration, Wellesley, Mass. Its size may be judged by the people standing beneath it in the picture.

The vividly colorful globe is built to a scale of 1 inch to 24 miles. It can revolve to simulate the daily rotation of the earth on its axis. It also moves around a circular track to demonstrate the earth's orbit.

Holding the globe at its proper "tilt" is a six-ton assembly consisting of shaft, socket, and lower bearing support. All these components are forgings made and finish-machined by Bethlehem. The mounting and carriage are also products of Bethlehem shops.

Tonnagewise, the forgings in this exhibit are small. But as we've said so often, our shops welcome the lightweight jobs, and give them the same careful handling as the heavy-tonnage items. We have produced some of the biggest forgings on earth, and some of the smallest. No matter what size you may need, or what type, we will always be glad to take care of your requirements.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

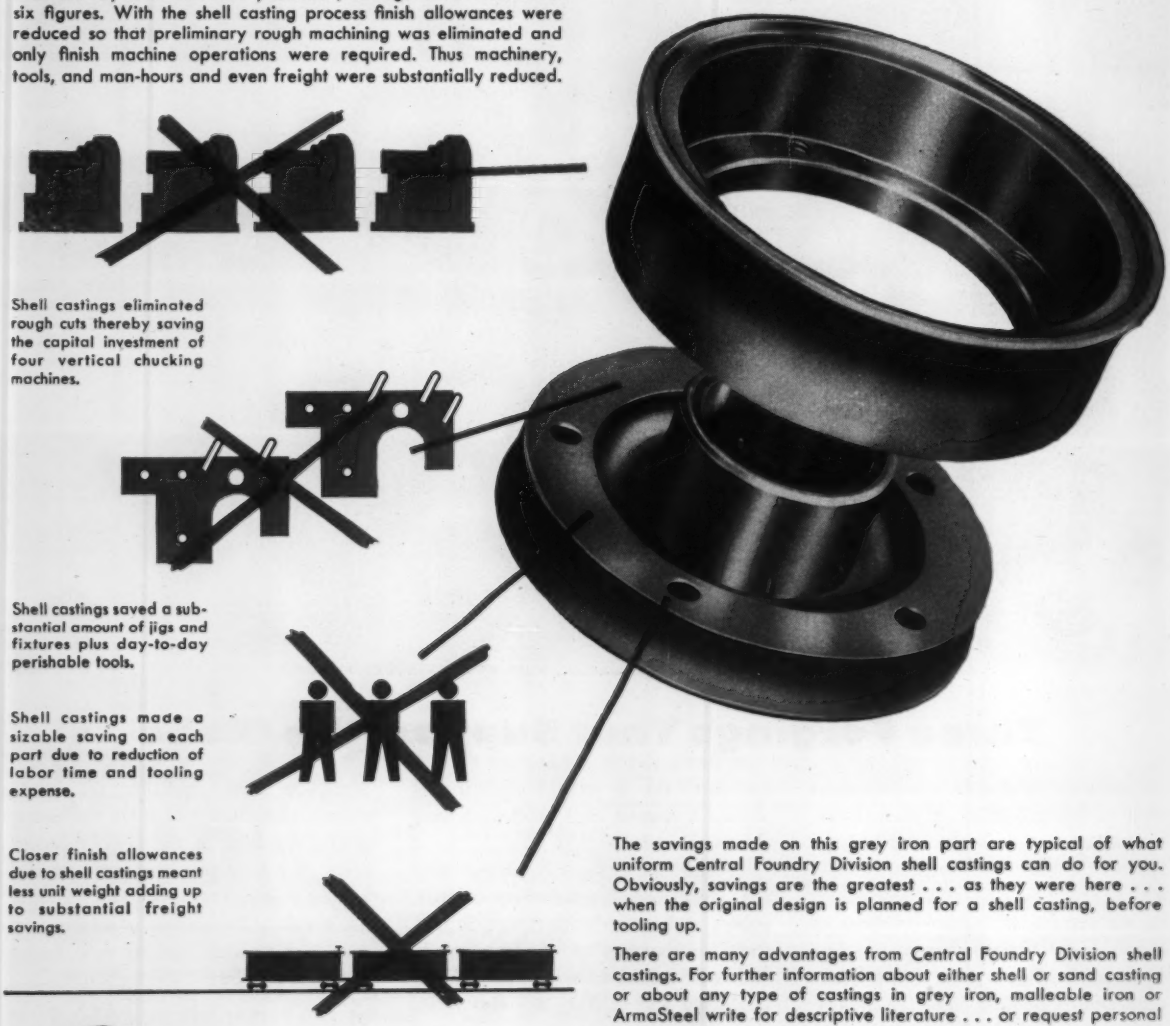
**BETHLEHEM STEEL**

BETHLEHEM STEEL

# LOOK AT THESE $AVING$

## MADE ON THIS STATOR BLADE CARRIER WITH CENTRAL FOUNDRY SHELL CASTINGS

The new method of mold-making called shell-cast, now being employed extensively here at Central Foundry Division makes possible many savings. The method is this: A thin shell of sand bonded by a thermo-setting plastic, forms the mold. This shell has a hard, smooth surface as accurate as the pattern itself, and results in castings with greater uniformity, much closer tolerances, and clean, sand-free surfaces. A typical example of savings the new-type mold makes possible is shown in this Stator Blade Carrier. By having it shell-cast by Central Foundry Division, savings were effected in six figures. With the shell casting process finish allowances were reduced so that preliminary rough machining was eliminated and only finish machine operations were required. Thus machinery, tools, and man-hours and even freight were substantially reduced.



Shell castings eliminated rough cuts thereby saving the capital investment of four vertical chucking machines.

Shell castings saved a substantial amount of jigs and fixtures plus day-to-day perishable tools.

Shell castings made a sizable saving on each part due to reduction of labor time and tooling expense.

Closer finish allowances due to shell castings meant less unit weight adding up to substantial freight savings.

The savings made on this grey iron part are typical of what uniform Central Foundry Division shell castings can do for you. Obviously, savings are the greatest . . . as they were here . . . when the original design is planned for a shell casting, before tooling up.

There are many advantages from Central Foundry Division shell castings. For further information about either shell or sand casting or about any type of castings in grey iron, malleable iron or ArmaSteel write for descriptive literature . . . or request personal help from our experienced engineers, without obligation.

59

# CENTRAL FOUNDRY DIVISION

GENERAL MOTORS CORPORATION • SAGINAW, MICHIGAN • DEPT. 20

*Traveloader placing heat-exchanger tubes on "Christmas Tree" racks to conserve yard storage space.*

# Traveloader... solves handling of bulky, heavy loads

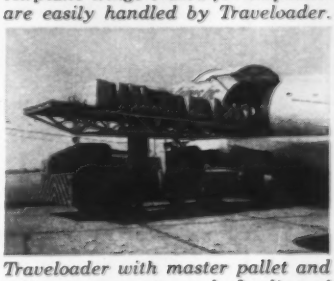
Here is a revolutionary new material handling machine designed expressly for long, unwieldy awkward loads. It picks up loads from the side, carries them securely on the truck deck, and stacks them to a height of 12 feet. It operates indoors or outdoors, in 10 foot aisles, over paved or unpaved roadways—and over highways at speeds up to 30 MPH!

Traveloader is available with gas or diesel powered engine, in 10,000 and 12,000 pound capacities. Write for descriptive bulletin No. 1360.

## No other ONE machine offers these features:

1. A *ONE MAN* operated lift truck and transporter.
2. SIDE LOADING for straight line pick-up and delivery.
3. CARRIES LOADS equally distributed over two axles and four pneumatic-tired wheels.
4. TRAVELS with payload up to 30 MPH.
5. STACKS LOADS 12 feet high from 10 foot aisles.

*Airplane wings crated for shipment are easily handled by Traveloader.*



*Traveloader with master pallet and roller conveyor speeds loading of aircraft.*

Baker handling equipment

**THE BAKER-RAULANG COMPANY**

1259 WEST 80th STREET • CLEVELAND 2, OHIO

Subsidiary of Otis Elevator Company

5T6

# Here's the Complete "Package"

## for Counting Electrically...

*Added Evidence that —*

## Everyone Can Count on VEEDER-ROOT

This Veeder-Root Reset Magnetic Counter (AC or DC) is actuated through electromagnets. And it may be connected in series with any device having a contact arrangement . . . like the specially designed Veeder-Root Electrical Contactor at the left, which insures positive operation of the counter, either in oscillation or connected directly to a revolving shaft . . . with the counter placed at *any* distance from the machine or process on which the count is required.

This is another one of the hundreds of Veeder-Root Standard and Special Counting and Computing Devices developed for every conceivable counting duty, in every field from atomics to electronics.

What do *you* need to count? Just write:

**VEEDER-ROOT INCORPORATED**
**HARTFORD 2, CONNECTICUT**

Chicago 6, Ill. • New York 19, N. Y. • Greenville, S. C.
Montreal 2, Canada
Offices and Agents in Principal Cities
**"The Name that Counts"**

STEEL
The Metalworking Weekly

JANUARY 16, 1956
Vol. 138 No. 3

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A MARK to Remember

For over three quarters of a century, the Seymour trade mark has been a symbol for the finest quality NICKEL SILVER — PHOSPHOR BRONZE — BRASS — NICKEL ANODES — BRIGHT NICKEL PROCESSES — WELDING RODS and other non-ferrous products.

It has also been a symbol for Seymour SERVICES — speedy, same-day acknowledgment of orders and inquiries — expert engineering and metallurgical help in selecting and specifying non-ferrous metals for special applications.

Fine, dependable products and fast, friendly service . . . these are the qualities which have made the Seymour sunburst a trade mark to remember.

In the months ahead you will see and hear a lot more about Seymour and the products it manufactures. The news will come from Seymour distributors and Seymour representatives.
Watch for it. Listen for it.
MARK IT WELL!

THE SEYMOUR MFG. CO.
500 FRANKLIN STREET
SEYMOUR, CONN.
NEW YORK SALES OFFICE:
CHANIN BUILDING — CABLE, SEYMOURCO

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

**Do you save money when you by-pass your distributor?**

See Page No. 20

OWNER MANAGED...
LORD BALTIMORE HOTEL

*Stands to reason . . . owner operation logically assures you a more personal attention to your comfort and convenience. Teletype BA263*

# behind the scenes

## Looking Backward

Genial Harold Rowland, STEEL's advertising director, recently sent out a mailing piece to our advertisers and their agencies. Admittedly, this smashing news rivals in interest the report that ice may be found in Greenland, but before you say "so what," wait for the gimmick.

Harold's letter was dated "New Year's Day, 1966," and it said, in part: "Let's consider the dateline above is correct. This is Jan. 1, 1966 . . . and we are looking back.

"We're seeing a fabulous America that has grown almost 20 per cent, to a population of nearly 187 million!

"We've seen tremendous strides made as our annual Gross National Product has grown more than $180 billion greater than it was ten years ago!

"And every four weeks throughout the decade, we've seen the equivalent of a Canton, O., added to our U.S.A.!

"Back in '56 these predictions seemed fantastic. But when we look back ten years from today, we'll probably find they were conservative."

## Adds New List

Claude Schaffner, president of the Schaffner Advertising Agency, New Haven, Conn., received one of these letters, and it sent him leaping for a new quill and fresh sheet of foolscap.

"Dear Mr. Rowland," he wrote. "I say amen to your look-backs. Here are ten of mine:

"1. Passing of the gangsterism thought in industry and labor management.

"2. The beginning of the end of beverage booze.

"3. The back of our hand for juvenile punks.

"4. About-face in the march of statism.

"5. End of tax and dues collecting for industry.

"6. Closer check on the manufacture and sale of explosives and war materiel to 'firebrand' countries.

"7. A speed-up in the development and manufacture of the Convertiplane.

"8. Better consolidation of religions on major national issues.

"9. A decrease in back-breaking labor throughout the country.

"10. The end of smog!"

Mr. Schaffner added that there were other look-backs, but they hadn't come to mind. This gives us an opportunity to alert our half dozen faithful readers, and invite them to list the things which, in their opinion, will be gone with the wind in 1966, or will be part of our daily living. For a start, we'd like to see the end of "cute" Christmas phonograph records, and full development of the one-man helicopter. What are *your* look-backs?

## Frustrated Serpents

The E. I. du Pont de Nemours & Co. is not an outfit to let grass grow under its feet when new markets beckon. A product information release informs us that it looks with favor on a nifty, lightweight, re-usable snake-bite kit—just the thing to have in your vest pocket when poisonous snakes happen to be biting you. The kit is manufactured by the B. F. McDonald Co., Los Angeles. Du Pont's only interest in the deal is in Zytel, a nylon resin plastic from which the kit is molded.

Zytel is light in weight, extremely tough and can be sterilized in boiling water. Through careful use and management of your snake-bite kit, you can allow yourself to be bitten again and again in safety, if not in comfort.

## Ten-Letter Word

Now that the holidays are over, perhaps we can catch up on our puzzles. The respective ages of our young cannibals were: Mbingo, 8; Mbango, 5; Mbongo, 3. The numerals the Miller boys wore on their sweaters were, Horatio, 6; Ambrose, 2; Androcoles, 9. George W. Frederick, Republic Steel Corp., Moline, Ill., got the correct numbers back so fast you would think he was coach in charge of sweatshirts. Here's an oldie to play with. Take the letters in "ROAST MULES," and assemble them into one other word. As far as we know, there's only one word that fits.

Shrdlu

(Metalworking Outlook—Page 31)

# G.E. Announces New Induction Heaters

## COMPARE THESE PRACTICAL DESIGN FEATURES

| DESIGN FEATURES | G.E. | Mfg A | Mfg B | Mfg C | Mfg D | Mfg E | Mfg F |
|---|---|---|---|---|---|---|---|
| High KVA Oscillator | ✓ | ✓ | ✓ | | ✓ | | |
| Built-in Water-to-air Heat Exchanger | ✓ | | | | | | |
| Readily Accessible For Maintenance | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Four Models in Each Rating | ✓ | | | | | | |
| Totally Enclosed Aluminum Oscillator Box | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Dust-tight Cabinet Construction | ✓ | | | | | ✓ | |
| Industrial-type Oscillator Tubes | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Filament Voltage Regulation of ±3% | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Water Flow Switch to Protect Oscillator Tube | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Three Instruments on Control Panel | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |

GENERAL ELECTRIC

Annealing, brazing, soldering, or hardening—whatever the job, G.E.'s new line of electronic induction heaters will help you do it faster, more economically. This new line features four models in each of four ratings (7½-, 15-, 25-, 40-kw) to let you pick the model you need—without wasted investment. Compare (left) this partial list of practical design features with six other leading induction manufacturers, and see why—G.E. gives you MORE KW FOR YOUR HEATING DOLLAR. For more information, contact your nearby G-E Apparatus Sales Representative.

Section A722-3, General Electric Co., Schenectady 5, New York

FREE—New bulletin "New G-E Induction Heaters" GEA-6388.

Name_____

Company_____

Street_____

City_____ State_____

**FIRST WE DEVELOPED 1105 ROPE WIRE.**

**THEN WE MADE ROEBLING'S**

# *Royal Blue*

**WIRE 1105 ROPE**

**1105** takes Royal Blue out of the ordinary wire rope class.

**1105** is a rope wire that's new—that's stronger. It's the biggest news in many years.

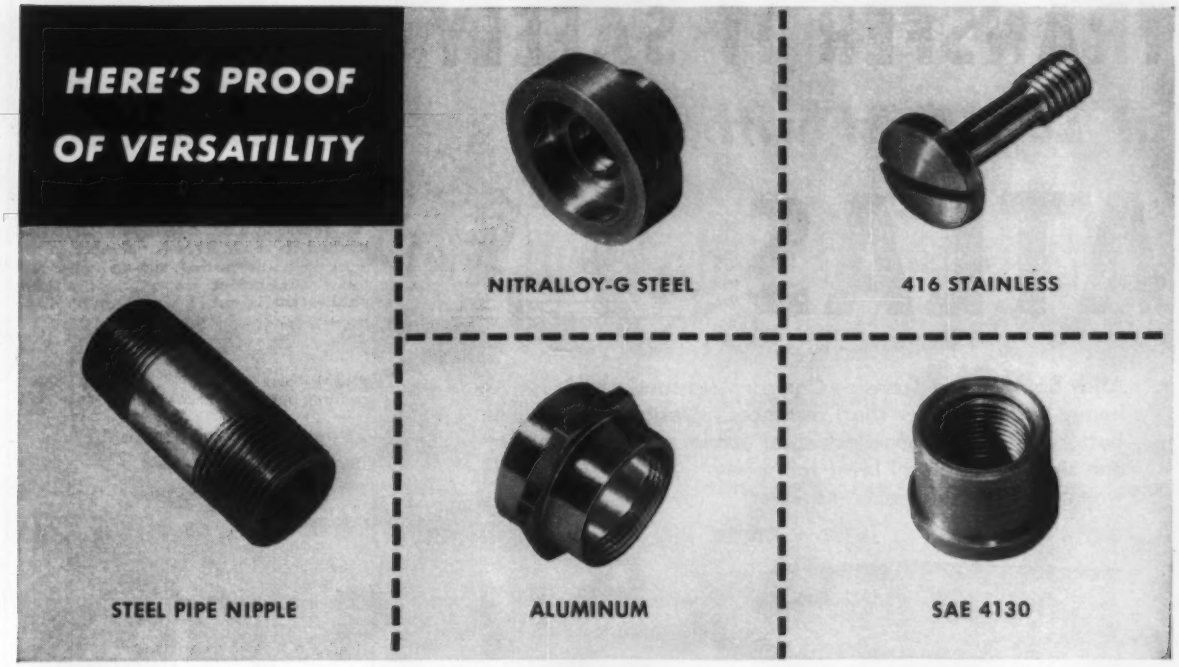
**1105** is the result of more than a century of research and development—it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

*Contact your Roebling distributor or write us for the full story.*

# ROEBLING

*Subsidiary of The Colorado Fuel and Iron Corporation*

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 331 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.




# SUN DEVELOPS VERSATILE NEW CUTTING OIL FOR SCREW MACHINES AND JOB SHOPS

**New cutting oil, Sunicut 5534, is moderately priced... gives excellent machining results on wide range of steels**

**New Sunicut 5534** is a non-emulsifying, transparent cutting oil specially compounded to give above-average machining results to operators who want a single oil to machine a large variety of ferrous metals.

**Tests have proved** that new Sunicut 5534 meets this demand for an all-purpose cutting oil. It is ideal for general screw machine and turret lathe work. It is also excellent for tapping, drilling, threading, and light stamping operations. In addition, new Sunicut 5534 can be used on many special machining jobs, both high and low speed, with metals ranging from B1112 to 4130 as well as free-machining stainless steels.

**For complete information** about new Sunicut 5534 and how it can help you reduce your oil inventories... lower your production costs... see your Sun representative. Or write SUN OIL COMPANY, Phila. 3, Pa., Dept. S-1.

SUNOCO®

**INDUSTRIAL PRODUCTS DEPARTMENT**

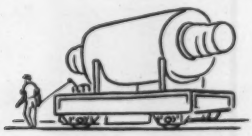
## SUN OIL COMPANY, PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

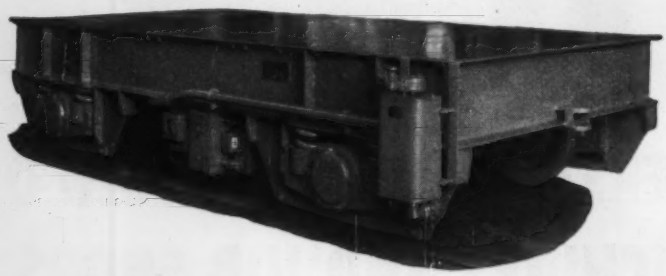
# TRANSFER IT SAFELY

## *at Less Cost with*

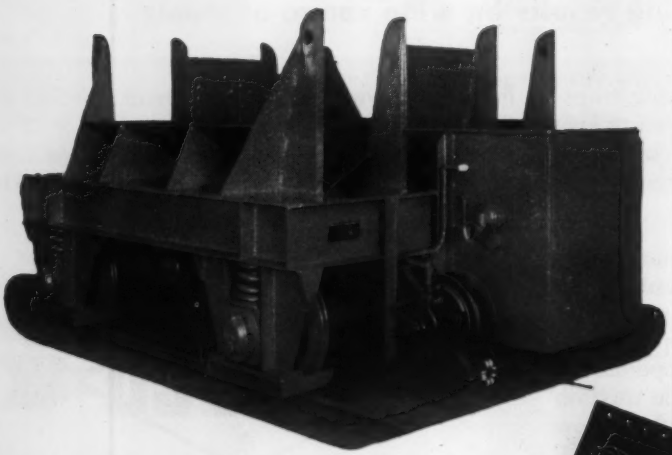
# ATLAS



Atlas Safety-Type Transfer Cars are outstanding for moving heavy materials over short distances. Designed for storage battery, diesel or gas-electric, or cable reel service. Only one simplified control lever for safety. The car moves only when the operator holds the lever.



**50-TON STORAGE BATTERY FLAT CAR**



**64-TON ELECTRIC FLAT CAR**

***Request "Walk-Along" Bulletin 1283***

**THE ATLAS CAR & MFG. CO.**

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.


# LETTERS
## TO THE EDITORS

### New Tool Steel Guide

Would you please send me your *Guide for Selecting Tool Steels and Carbides*, printed in 1952? This is valuable in my work as a die-casting, die-and-gage and tool-fixture-layout inspector. If a later publication is out, I would rather have it.

Robert Heun
3172 S. 35th Street
Milwaukee

• *The new edition of this guide is coming out in March of this year.*

### Engineers Have Problem

Your article, "Unrest Among Engineers" (Dec. 26, page 29), interests me. Many of your points I have used over a negotiating table to bring forth the problem of our engineers. I would appreciate a few copies.

H. Lauterbach
151 W. Mt. Royal Rd.
Milwaukee 17, Wis.

. . . your statistics were most interesting and should be a big help in our college recruiting program.

G. R. Ginder
Asst. Plant Industrial Engineer
U. S. Steel Corp.
Gary, Ind.

I would like three copies. I think you have touched on several important points.

Virgil E. Bottom
Director, R & D
Semiconductor Prod. Div.
Phoenix Research Laboratory
Motorola Inc.
Phoenix, Ariz.

This is an outstanding article. We would appreciate ten copies.

C. J. Brillinger
Dir. of Training & Education
York Corp.
York, Pa.

### Information About Leasing

If reprints of the article, "Blow to Equipment Leasing" (Nov. 21, page 52), are available, we would appreciate a copy. You have done well in putting this informative article together.

Ib Jensen
General Sales Manager
Riehle Testing Machines Div.
American Machine & Metals Inc.
East Moline, Ill.

### Series Is Valuable

I would appreciate one copy of each of the ten articles in your 1955 Program for Management series so I can file them separately. This material is valuable for my courses in cost control

*(Please turn to page 12)*

# Polyken Tapes have
# CONTROLLED STRENGTH
## (and that's what saves the money)

**Controlled Strength solves packing problems.** This job of bundling aluminum strips requires only a narrow strip of *Polyken* Tape No. 113, 1½ times the circumference of the bundle . . . at a considerable saving of time and tape.

**Controlled Strength offers greater protection.** These cutting tools are guarded with a durable, abrasion-resisting sheath of *Polyken* Tape No. 113. Twice as much of a fragile tape wouldn't give stored tools equal protection.

**CONTROLLED STRENGTH:**
**the right combination of backing and adhesive to give you "all work —no waste"**

**Here's how it can help you:** Because you can select the right *Polyken* Tape for the right job, you get all the sticking power . . . all the tensile strength . . . all the tear resistance you need. When you need special qualities, there's a *Polyken* Controlled Strength Tape that has them.

That way—the Controlled Strength way—you do the job *right* for the *least* amount of money.

Take *Polyken* No. 113 as an example. See how this low-cost tape works harder . . . and more efficiently . . . through its "just right" application to the job at hand (whether it is sealing, holding, bundling or protection).

In fact, plant surveys show this tape is being used for more than 245 specific applications—all at a savings!

**Use this convenient coupon to find out how *Polyken* Controlled Strength Tapes can mean "all work—no waste" on the job for you.**

Polyken®
CONTROLLED STRENGTH
**INDUSTRIAL TAPES**
THE KENDALL COMPANY, POLYKEN SALES DIVISION

*Polyken*, Dept. S-A
222 West Adams St., Chicago 6, Illinois

Please send me physical properties and further information on *Polyken* Controlled Strength Tapes.

Name _____ Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

# Program for Management . . 1956

Your sleeves are rolled up. You're expecting another record year. Manufacturers' sales in metalworking will reach $138 billion—an 8 per cent gain over 1955.

Your industry is starting up a new expansion slope. Its getting bigger. Your problems are becoming more complex.

STEEL's 1956 Program for Management theme—Expansioneering, How to Plan Your Growth—can act as a catalyst for your scientific management planning for the coming months and years. Can you afford to miss the following?

**Feb. 13**
**IT'S TIME TO GROW**
When, How and Where to Expand

**Mar. 19**
**KNOW YOUR COSTS**
Avoid Profitless Prosperity

**Apr. 23**
**IDEAS FOR INDUSTRY**
The Key: Creative Thinking

**May 14**
**METALWORKING GOES TO MARKET**
Distribution Problems Grow with Development

**June 18**
**NEW HORIZONS FOR METALWORKING**
Technological Gains Open Larger Markets

**July 16**
**HOW TO LIVE WITH SUP**
Can It Be Converted to a Benefit?

**Aug. 13**
**TO MERGE OR NOT TO MERGE**
A Study of the Pros and Cons

**Sept. 24**
**MOTIVATING MEN TO PRODUCE MORE**
Which Incentives Will Bring Results?

**Oct. 15**
**AUTOMATION—BOGEYMAN OR BONANZA?**
A Study of the Social and Economic Aspects

**Nov. 12**
**INDUSTRY AND COLLEGE—PARTNERS IN DEVELOPMENT**
The Result: Better Men for Industry

# LETTERS

*(Concluded from page 10)*

and management planning. Most of the articles are really excellent.

Ernest H. Weinwurm
Associate Professor
College of Commerce
De Paul University
Chicago

Please forward one copy of each article in the series. I find them informative and well worth keeping.

R. J. Miller
City Auto Stamping Co.
Toledo, O.

## Conservation Piece

May I have three copies of the article, "Lacquer Boosts Vacuum Finishing" (Dec. 5, page 124). Such information is handy reference material which we use in talking to our customers.

L. A. Strobel
Industrial Heating Engineer
Detroit Edison Co.
Detroit

## Coating for Resistance

We wish to compliment you on the article, "War on Wear" (Nov. 28, page 98), and we would like more information on Aldip and Alumicoat aluminum coatings for hot wear resistance.

C. E. Horner
Chief Metallurgist
Chemical & Physical Section
Electronic Tube Division
Westinghouse Electric Corp.
Elmira, N. Y.

●*We are forwarding the articles, "Dip Valves for Higher Performance" (Oct. 11, 1954, page 114) and "Aluminum Guards the Surface" (July 25, 1955, page 110). The Arthur Tickle Engineering Works Inc., 21 Delavan St., Brooklyn, N. Y., is the only licensee we know of. General Motors Corp. holds the patent.*

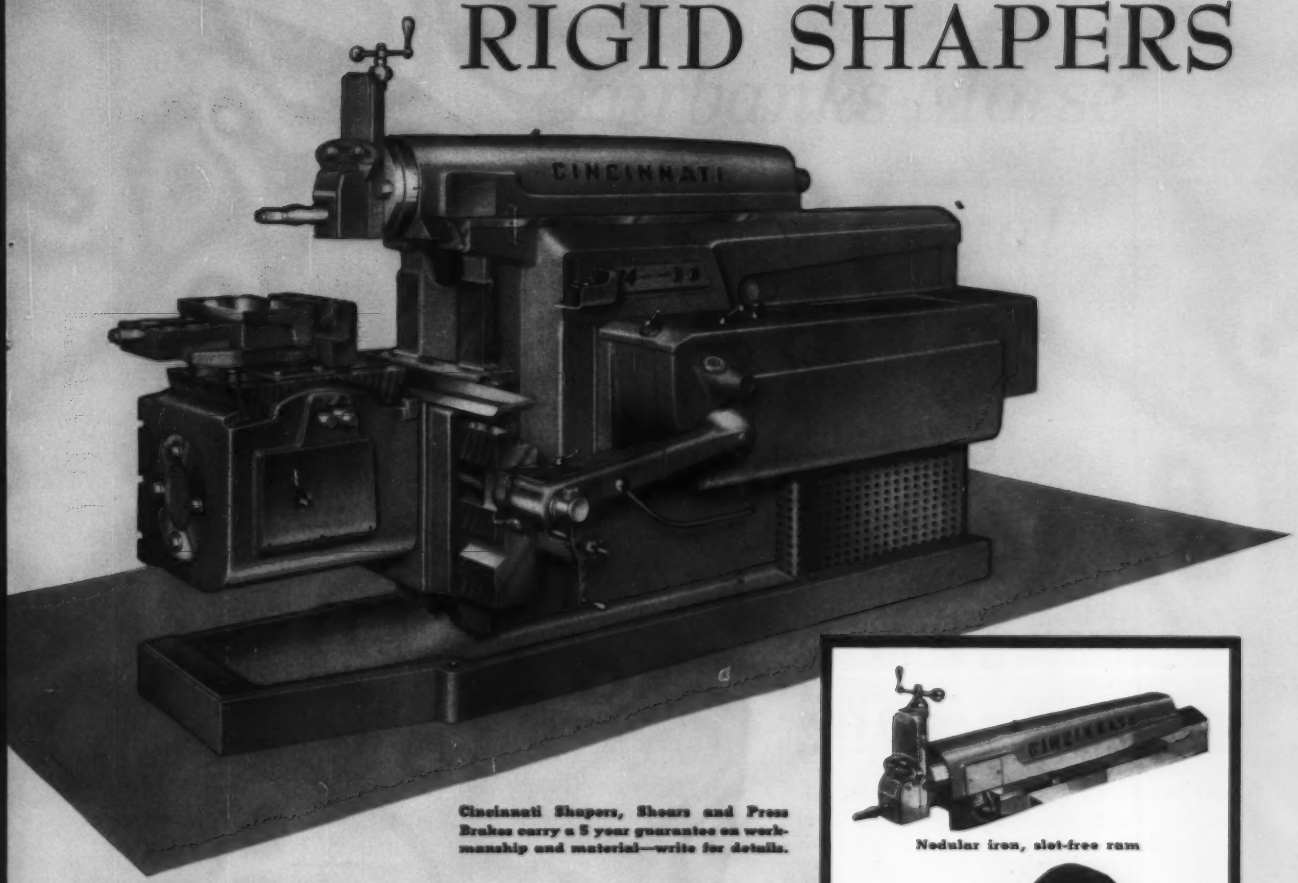
## Product Being Withdrawn

We believe we recently have seen advertisements in STEEL on Toncon iron. We have a customer interested in this material. It will be appreciated if you would tell us the manufacturer. We are told it has been purchased in sheet form.

F. D. Craver
Babcock, Hinds & Underwood Inc.
Binghamton, N. Y.

●*The producer, Republic Steel Corp., has been withdrawing the product because of technological changes in the steel industry. It used to quote prices under the heading of hot-rolled ingot sheets and strip, but quit doing so in the last several months. See the article, "Another Victim of Progress" (May 30, page 110).*

# CINCINNATI RIGID SHAPERS

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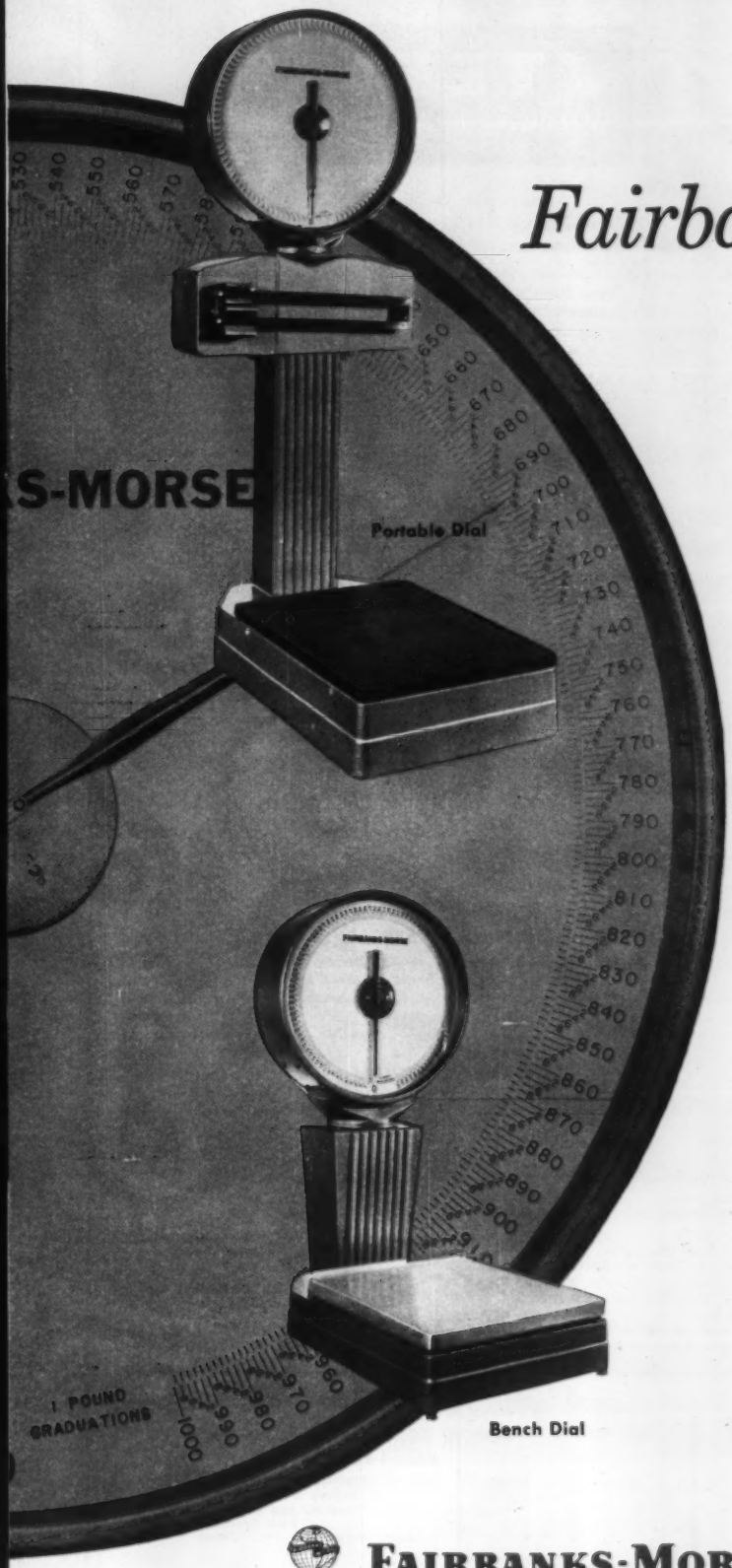


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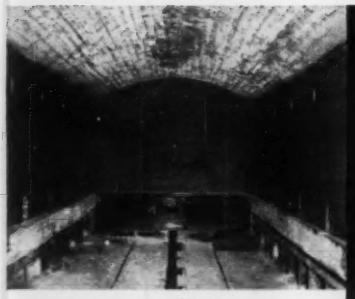
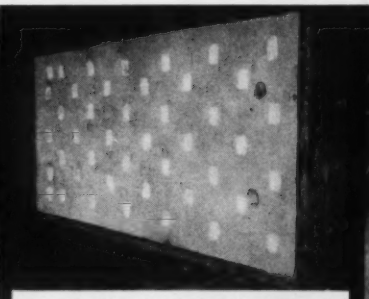
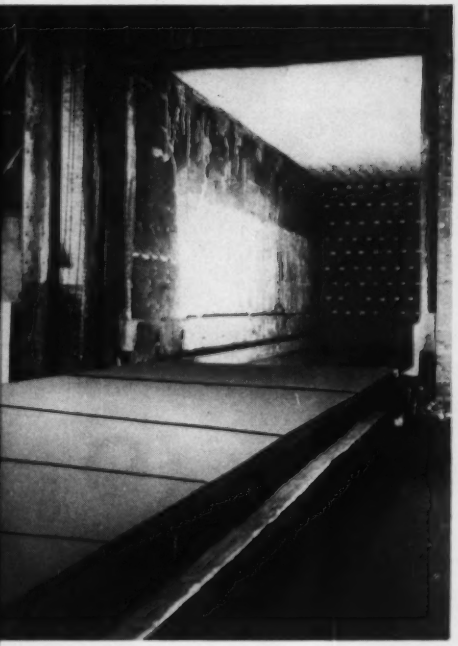
# *Profitable trends in the use of refractories*



Car-type forge furnace with Laclede castable refractory walls

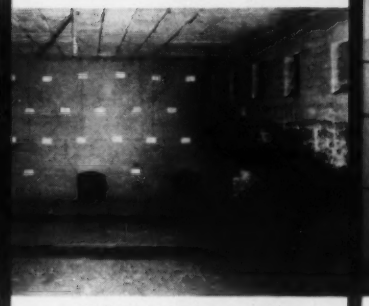


Soaking pit cover made with Laclede Plastic refractory



Car-type furnace lined with Laclede Castable and Plastic Refractories

Batch-type reheating furnace lined with Laclede Castable



Walking beam furnace with Laclede Plastic side and end walls

## Time and cost savings explain increasing use of LACLEDE Castable and Plastic Refractories

Increasingly successful and profitable uses of castable and plastic refractories are changing refractory practices in many mills and plants. Experience shows that when castables and plastics are properly selected and installed, time and cost savings may amount to 300% or more. Results plus ease and speed of installation contribute to these savings.

Correct selection of castables and plastics is simplified by the availability of a complete range of Laclede-Christy products. Laclede-Christy produces castables and plastics to meet every condition.

Laclede offers refractories for high or moderate temperature service, and to meet specific insulating property requirements. Specific qualifications such as refractoriness, strength, thermal conductivity, abrasion-resistance and erosion resistance are met in varying degrees, according to the castable or plastic recommended and selected.

Undoubtedly you can use Laclede-Christy Castables and Plastic Refractories to profitable advantage. What's your situation? What more would you like to know? Your nearby Laclede-Christy representative will be glad to give you specific information.

### Laclede-Christy Castable and Plastic Refractories

**Castables for high temperature service** to 2400° F and higher: Steelcast, Firmcast, Super Castable, Gun Cast and 3000° Castable.

**Castables for insulating properties** and service temperature to 2400° F: Porelite, Porelite 50, Porelite VL.

**Pitco Plastic** — for high temperature service (3150° F), where metal oxide penetration is severe.

**Super-Set Plastic** — for high temperature service (3150° F), where air dried bond is a factor, and where heat cannot be applied shortly after ramming.

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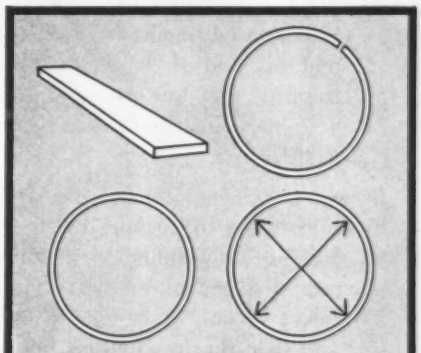

**THIS IS THE BASIC CLEVE-WELD PROCESS.** Rectangular bars or special contoured sections of steel are rolled into a circular form. Next, the part is welded and then expanded into a true circle. This tests the weld and insures accuracy. Later operations add stress relief and desired hardness.

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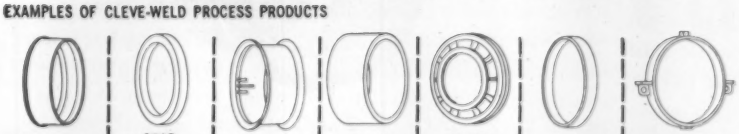


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Please send me your Cleve-Weld Process Brochure.

NAME_____

TITLE_____

ATTACH TO YOUR COMPANY LETTERHEAD AND MAIL.

# Do you save money when you by-pass your distributor?

Offhand . . . you might say you save money when you buy direct from manufacturers.

Experienced purchasing men would tell you that this kind of "bargain" is heavily booby-trapped, that low prices at the expense of your local distributor are often very costly to the buyer.

Sure, it's great at first . . . buying major items direct from the maker. But direct buying has a way of snowballing . . . the buyer finds himself in a widening spiral that includes the direct buying of more and more items . . . and then they're anything but bargains. For the savings effected by direct buying are more than swallowed up by extra man-hours needed to handle the volume of paper work it entails, to say nothing of extra shipping costs and warehousing expenses. Add to that the loss of the competent on-the-spot advisory service your local distributor gives you, and you'll agree that it would take far more than the modest saving you'd realize to compensate for the total cost of such purchasing.

We are convinced that it is advantageous to *both* the buyer and seller to have products go through a distributor. By minimizing the manufacturer's sales and distribution costs, by providing a "department-store for industry" to supply *all* purchasers, by giving services that only a local organization can provide efficiently, we are convinced that today's distribution pattern—from maker to local distributor to user—is the most effective and economical it is possible to devise.

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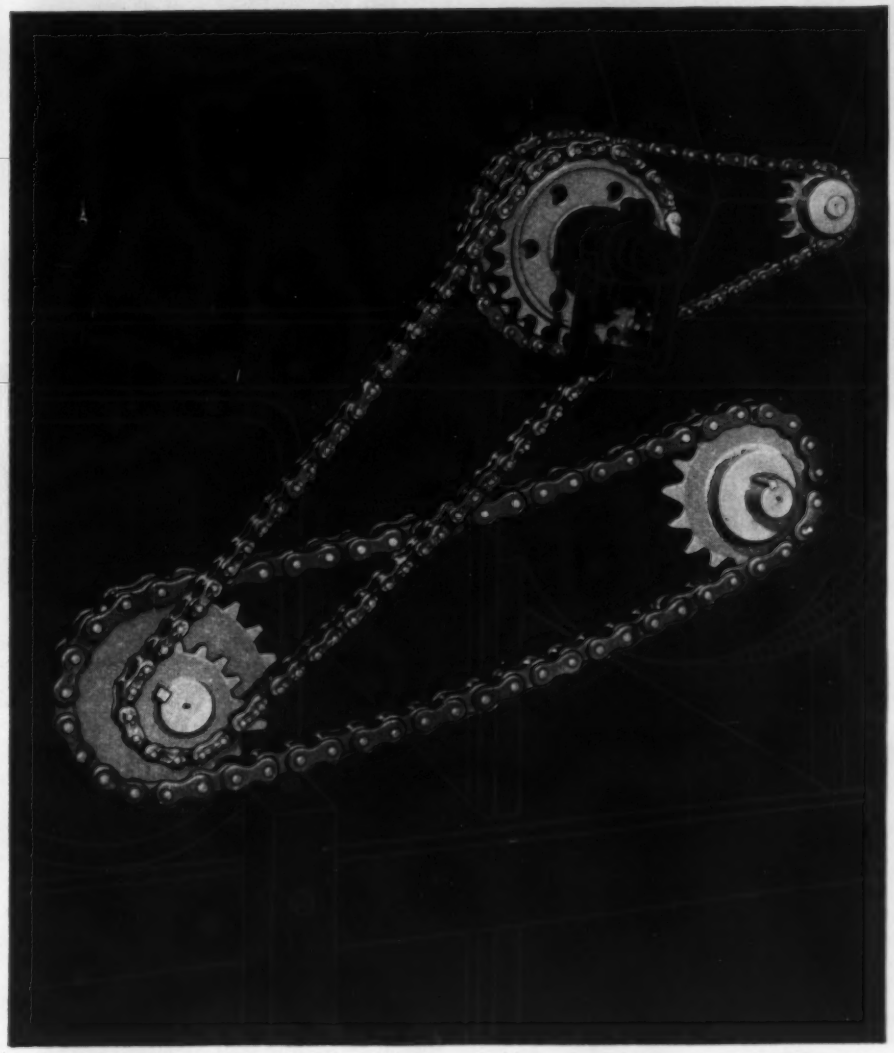
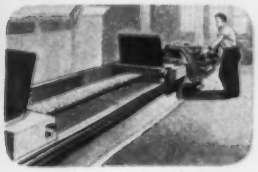
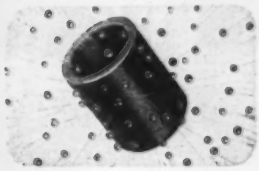


**LOCK-TYPE BUSHINGS** (applied on a range of sizes) end a cause of stiff chain



**PRE-STRESSING** of multiple width chain provides uniform load distribution.



**SHOT-PEENED ROLLERS** have greater fatigue life, added ability to withstand impact.

**CLOSER HEAT-TREAT CONTROL** — coupled with rigid testing insures uniformity.

## *And you pay no premium for these LINK-BELT extras

BIG reason why Link-Belt Precision Steel Roller Chain is first choice for so many tough jobs is that it has *extra reliability built-in.* For example, pre-stressing smooths out any irregularities of multiple width chain *in advance.* And it's just one of many *extras* you get as *standard* from Link-Belt. Check the three others shown here. Then call the Link-Belt office or authorized stock carrying distributor near you for facts on Link-Belt's complete range of roller chain and sprockets. Data Book 2457 gives full information on single and multiple widths, in ¼″ to 3″ pitch, 1″ to 3″ double pitch. Ask for your copy.

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13,702

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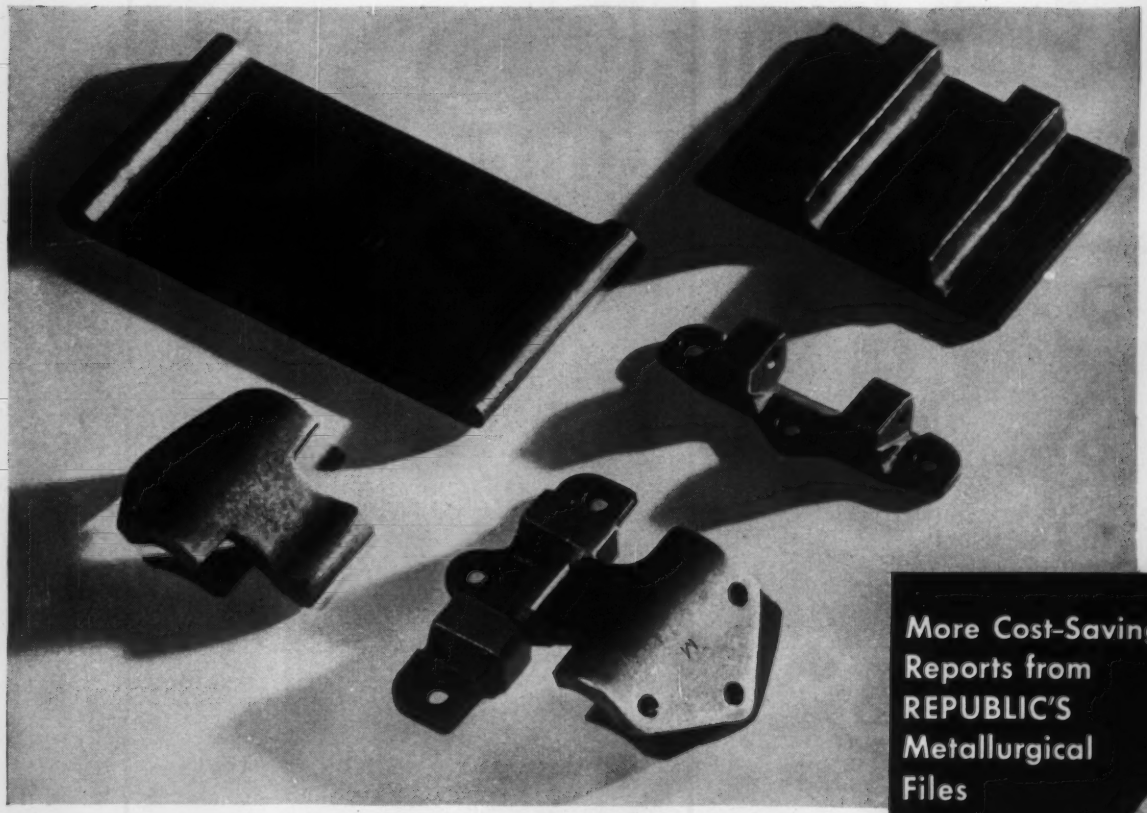


## ...the right metal in the right place

# CUTS MACHINING COST FOR HINGE MANUFACTURER

These automobile door hinges are produced at less cost because much of the machining has been eliminated. They are made from Republic Hot Rolled Carbon Special Sections preformed to the predominating cross section of the component parts of the hinge. Parts are cold formed by broaching. Drilling and tapping are the only other machining operations necessary.

You can save money, too, when your steel parts can be made from Republic Special Sections. Large tonnage requirements are not necessary, but they do result in greater economies. We can produce cold drawn special sections in carbon, alloy, and stainless steels, in large or small quantities, to meet your requirements. Possibilities for variation in contour are almost limitless. Republic also supplies heavy tonnages of hot rolled sections in the same various steels.

Selection of the proper steels for each application requires many considerations—performance conditions, length of service, cost, processing methods, to name a few.

A Republic representative will be happy to call at your plant and discuss the possibilities of applying Republic Special Sections to your parts. He will tell you promptly and impartially whether the nature of your parts would make the use of special sections efficient and economical. There is no cost or obligation. Mail the coupon for prompt action.

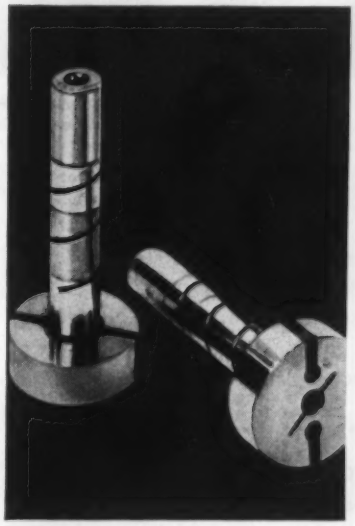
# REPUBLIC

REPUBLIC STEEL

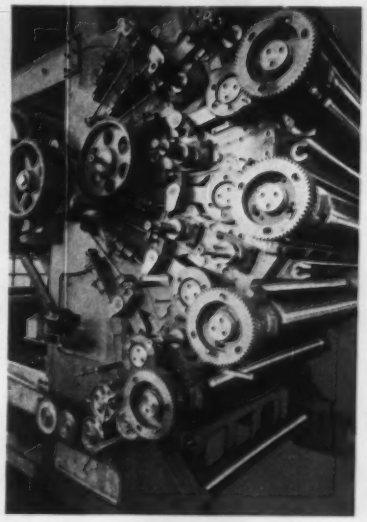
*World's Widest Range of Standard Steels*

## Republic Alloy Metallurgists help refrigerator manufacturer cut scrap losses 25%

Here are the results of a switch to Republic Cold Drawn Alloy Steels in making this refrigerator compressor rotor—scrap losses cut from 25% to 0.1%, several high-cost finish-grindings eliminated, an every-piece hardness check reduced to a simple spot check, distortion trouble eliminated. Republic Metallurgists, Field, Laboratory and Mill worked closely with the manufacturer's engineers in selecting the right alloy steel with the required structure for proper hardenability, machinability and surface finish. What about your product or process? This 3-Dimensional Metallurgical Service is available to all alloy steel users without obligation. Check coupon if you would like a Republic Field Metallurgist to call.



## Republic Pig Iron Metallurgist helps press manufacturer obtain superior finish and top machinability on cast parts



This company's requirements for cast parts are strict. They call for fine surface finish, wear-resistance, high strength and top machinability. To find a pig iron to meet these requirements a Republic Pig Iron Metallurgist was consulted. He recommended Chateaugay, Republic's exclusive premium pig iron. His recommendation was impartial because Republic is the only producer of all five grades of merchant pig iron. Chateaugay assures this company of fine grain structure throughout every casting. It cools evenly, fills adjoining light and heavy sections completely. Castings machine beautifully and economically. A Republic Pig Iron Metallurgist will be glad to show you how Chateaugay consistently outperforms other pig irons.

## Republic Machining Specialist helps customer increase production 18%

This automotive transmission parts manufacturer was having difficulty holding finish below 100 micro-inches. Part specifications called for a 40 to 60 micro-inch finish on a two-step internal bore, machined from Republic Cold Drawn B-1113 bar stock. A rush call went out for a Republic Machining Specialist. He looked over the job and designed a new broaching fixture and head to give a burnished finish under 10 micro-inches. The result: parts are superior to specifications; machine efficiency greatly increased; production up about 18%. What about you? Need help on machining or change-over problems? Republic Machining Specialists are ready with prompt solutions. Let us know when you would like one to call.

**STEEL**

*and Steel Products*

**REPUBLIC STEEL CORPORATION**
**3120 East 45th Street, Cleveland 27, Ohio**
I would like more information on Republic Special Sections.
☐ Hot Rolled ☐ Cold Drawn ☐ Have a representative call
I am interested in the services of a Republic
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☐ Machining Specialist
Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____
K-9621

# Today's new lightweight portable grinders need this kind of wheel!

## The new lightweight

# U. S. ROYALITE

## HARD SHELL CUP WHEEL

"X-ray" view of wheel shows pronged anchor bushing and safety ring.

Here a worker uses a lightweight grinder with a U. S. Royalite Hard Shell Cup Wheel, to remove weld butt and to clean up welded structural steel member.

Removing weld flash from fabricated steel component for atomic reactor. Careful dressing of weld flash was required to obtain smooth surface for joining with other components.

Contour grinding (to template) for smooth surface joint between components for atomic reactor. Component is of fabricated steel.

*This great wheel is powerfully reinforced by a pronged anchor bushing and safety ring assuring a safer and smoother-running cup.*

The U. S. Royalite® Wheel is "job-geared" for these modern lightweight portable grinders. Royalite's free cutting face has a tougher rim, which keeps the edge sharp for the full life of the wheel.

**EXTRA DIVIDEND:** Remember that when you buy wheels from a United States Rubber Company salesman you are dealing *direct* and are being served by a specialist—a man whose only job is selling and *servicing* abrasive wheels. He will see that you get maximum value out of your abrasive wheel dollars.

• • •

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US RUBBER

**Mechanical Goods Division**

# United States Rubber

# CALENDAR
## OF MEETINGS

**Jan. 18-19, Caster & Floor Truck Manufacturers Association:** Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

**Jan. 18-19, Steel Shipping Containers Institute Inc.:** Winter meeting, Hampshire House, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

**Jan. 18-21, National Tool & Die Manufacturers Association:** Annual winter meeting, Empress hotel, Miami Beach, Fla. Association's address: 907 Public Square Bldg., Cleveland 14, O. Executive secretary: George S. Eaton.

**Jan. 19-20, Steel Plate Fabricators Association:** Annual meeting, Palmer House, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

**Jan. 20, Malleable Founders' Society:** Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

**Jan. 23-24, Industrial Heating Equipment Association:** Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

**Jan. 23-25, Truck-Trailer Manufacturers Association Inc.:** Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John Hulse.

**Jan. 23-26, Plant Maintenance & Engineering Show:** Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 841 Madison Ave., New York 17, N. Y.

**Jan. 24, Cutting Tool Manufacturers Association:** Annual meeting, Detroit Yacht Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

**Jan. 24-27, American Management Association:** General management conference, Fairmont hotel, San Francisco. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

**Jan. 26-27, Blast Furnace & Coke Association of the Chicago District:** Winter meeting, Del Prado hotel, Chicago. Information: C. W. Bruce, chief engineer, Republic Steel Corp., 11600 S. Burley Ave., Chicago 17, Ill.

**Jan. 28-Feb. 4, Industrial Diamond Association of America Inc.:** Annual meeting, Hollywood Beach hotel, Hollywood Beach, Fla. Association's address: Box 175, Pompton Plains, N. J. Executive manager: Athos D. Leveridge.

**Jan. 29-Feb. 2, Associated Equipment Distributors:** Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 30 E. Cedar St., Chicago, Ill. Executive secretary: P. D. Hermann.

**Jan. 30-Feb. 3, American Institute of Electrical Engineers:** Winter general meeting, Hotel Statler, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

**Feb. 1-2, Midwest Welding Conference:** Armour Research Foundation, Illinois Institute of Technology, Chicago. Information: Harry Schwartzbart, Armour Research Foundation, 35 W. 33rd St., Chicago 16, Ill.

**Feb. 6-8, American Management Association:** Marketing conference, Hotel Statler, New York. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

**Feb. 9-10, Steel Kitchen Cabinet Manufacturers Association,** Spring meeting, Waldorf-Astoria, New York. Association's address: 1008 Engineers Bldg., Cleveland 14, O. Secretary: Arthur J. Tuscany Jr.

**Feb. 13-17, American Society of Civil Engineers:** Winter meeting, Baker hotel, Dallas, Tex. Society's address: 33 W. 39th St., New York, N. Y. Secretary: William N. Wisely.


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| 1/2" | .065" | 16 | .028" | 22 |
| 5/8" | .065" | 16 | .028" | 22 |
| 3/4" | .065" | 16 | .028" | 22 |
| 7/8" | .083" | 14 | .028" | 22 |
| 1" | .109" | 12 | .028" | 22 |
| 1-1/8" | .109" | 12 | .028" | 22 |
| 1-1/4" | .134" | 10 | .028" | 22 |
| 1-3/8" | .134" | 10 | .035" | 22 |
| 1-1/2" | .148" | 9 | .035" | 20 |
| 1-5/8" | .148" | 9 | .035" | 20 |
| 1-3/4" | .148" | 9 | .035" | 20 |
| 1-7/8" | .165" | 8 | .035" | 20 |
| 2" | .165" | 8 | .035" | 20 |
| 2-1/4" | .180" | 8 | .035" | 20 |
| 2-1/2" | .203" | 7 | .035" | 20 |
| 2-3/4" | .203" | 6 | .035" | 20 |
| 3" | .220" | 6 | .049" | 18 |
| 3-1/4" | .220" | 5 | .049" | 18 |
| 3-1/2" | .238" | 5 | .049" | 18 |
| 3-3/4" | .238" | 4 | .049" | 18 |
| 3-7/8" | .238" | 4 | .049" | 18 |
| 4" | .238" | 4 | .049" | 18 |
| 4-1/4" | .250" | 4 | .049" | 18 |
| 4-1/2" | .250" | 3 | .065" | 16 |
| 4-3/4" | .250" | 3 | .083" | 14 |
| 5" | .180" | 7 | .083" | 14 |
| 5-1/2" | .180" | 7 | .083" | 14 |

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

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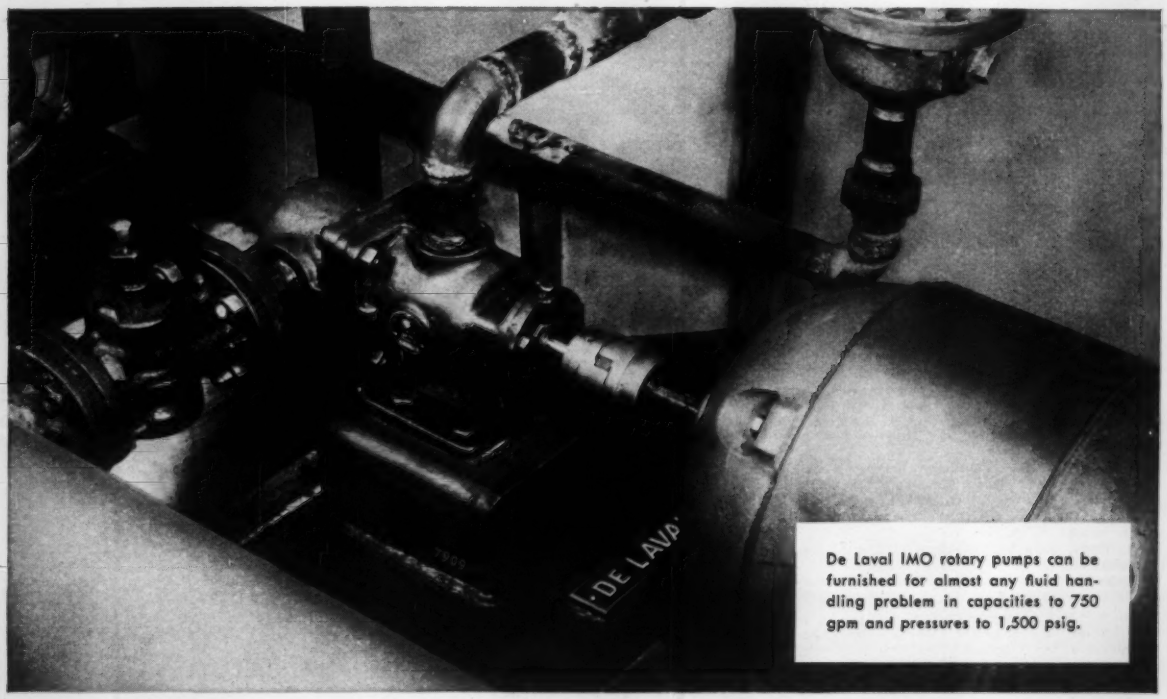



De Laval IMO rotary pumps can be furnished for almost any fluid handling problem in capacities to 750 gpm and pressures to 1,500 psig.

# What to Look for in a Rotary Screw Type Pump

*By* W. J. MONCON, *Assistant Chief Engineer*
*De Laval Steam Turbine Company*

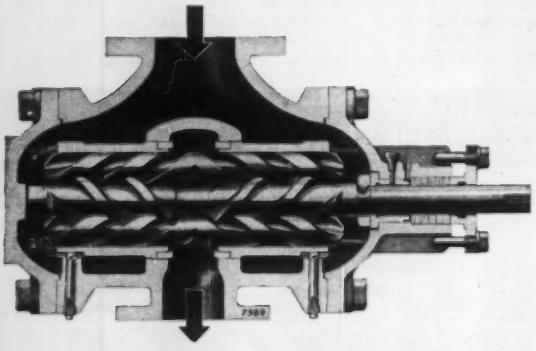
A sound knowledge of design, and how it affects performance, is the best insurance a buyer can have that he will get the pump he needs. This brief analysis of the IMO, a rotary three-screw pump manufactured by the De Laval Steam Turbine Company, will give you some of the necessary facts.

What qualities should you look for in a rotary type pump? It must, of course, meet specified capacities and pressures. But, it must also be efficient, operate quietly, stay on the job.

The axial flow of a screw type pump, and the resulting low inlet losses for any given pump speed, are important benefits that should be considered in making pump selections. The absence of timing gears and other mechanical features of construction also enable the De Laval IMO pump to operate at direct-connected motor and turbine speeds . . . to handle viscous liquids and high suction lifts.

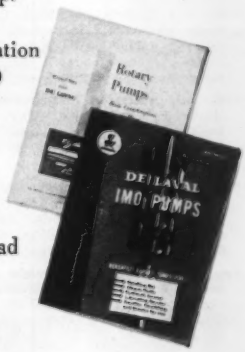
One of the most important features of the IMO pump is the hydraulic turning of the idler or sealing rotors. The central or power rotor is the pumping element; the liquid pumped turns the sealing rotors.

A screw type pump is well suited for applications where pulsation-free flow is desirable. The axial flow of the liquid without trapping and the unique thread form which keeps closures fluid-tight contribute to quiet operation of the IMO pump.



De Laval IMO Series A322A, a positive displacement, rotary screw type pump, can handle capacities to 750 gpm and pressures to 150 psig.

*Catalog LS* gives useful application and specification data on the IMO pump. An article titled, *Rotary Pumps, Basic Considerations in Their Application*, contains a description of rotary pumps in general. For these publications, write on your company letterhead to De Laval Steam Turbine Company, 860 Nottingham Way, Trenton 2, New Jersey. DL-301



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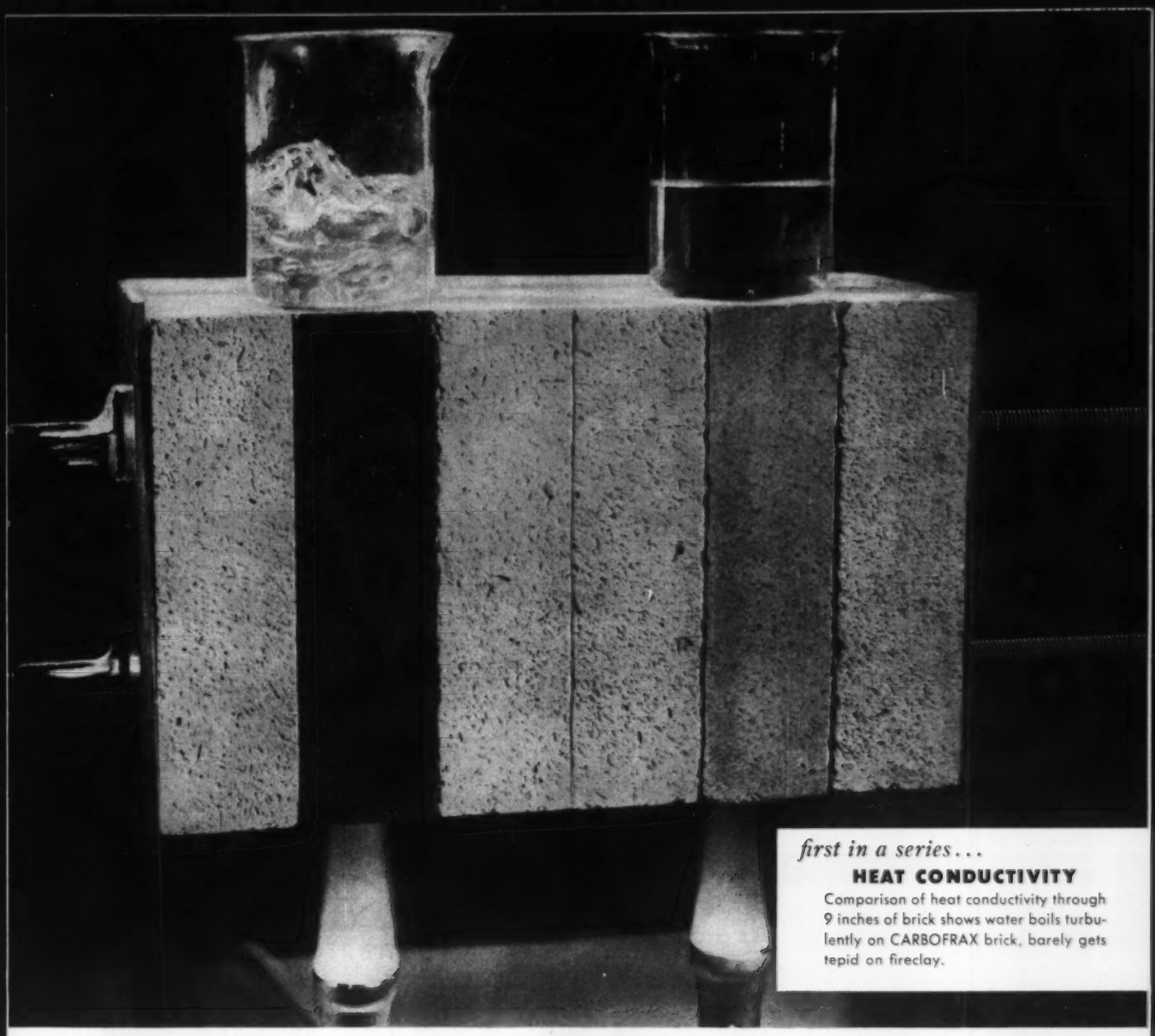

*first in a series...*

**HEAT CONDUCTIVITY**

Comparison of heat conductivity through 9 inches of brick shows water boils turbulently on CARBOFRAX brick, barely gets tepid on fireclay.

# Unusual Properties of Refractory Materials

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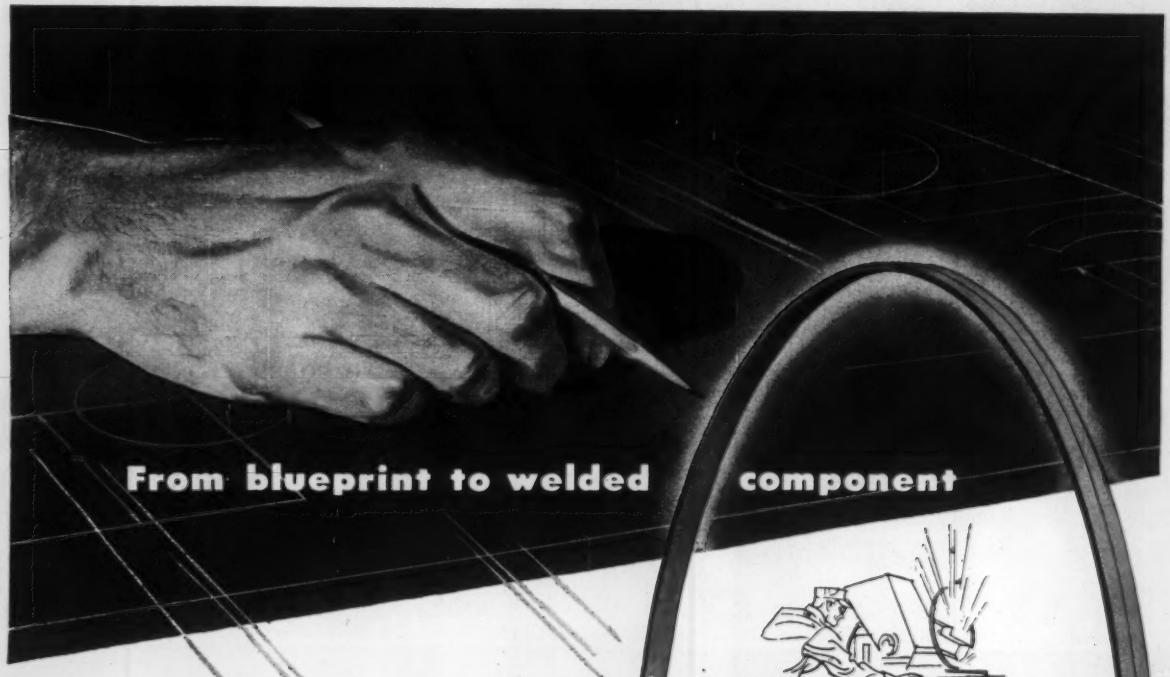


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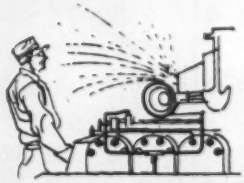

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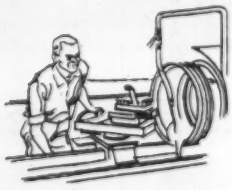

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## Fringes Are Higher

Fringe benefits cost greater Cleveland manufacturers an average of 38.54 cents per man-hour, up 8 cents or 25 per cent in the last two years. That's the finding of a survey by Associated Industries of Cleveland Inc., taking in 172 companies employing almost 77,000 hourly workers. Greatest increases came in companies employing 1000 or more. They are paying 39.62 cents per man-hour, up 9 cents from 1953. Companies having between 100 and 1000 workers are paying 5.7 cents more. Least change is registered in companies with under 100 hourly employees. They pay 35.64 cents now, compared with 32.20 in 1953. More than 30 different benefits are covered by the AIC survey. Most mentioned: Bonuses, vacations, pensions, insurance, rest periods and uniforms.

## Year for Home Improvement

If the U. S. Chamber of Commerce has its way, 1956 will be a record year for spending on home improvement. It estimates the potential outlays at more than $20 billion—more than new homebuilding is likely to reach for some years. Estimates of improvement spending in 1954 and 1955 run around $12 billion. The Chamber's Construction and Civic Development Department is spearheading a drive by builders, materials, finance and design men to persuade Mr. U. S. homeowner to buy the equivalent of a paint job and a refrigerator this year. It estimates that if each of our 48 million dwellings is improved $580 worth, the potential would be more than realized.

## State Taxes Go Up

Taxpayers will contribute more to state revenues in 1956 than ever before, says Commerce Clearing House, Chicago. A record number of important upward revisions in state tax legislation were enacted in 1955. Five big targets: Income, sales, gasoline, cigarets and motor vehicles. During 1955, 14 states boosted three or more of these taxes. Significant changes: Oregon levied taxes on income earned in the state but not subject to regular corporation taxes; local governments of 17 states were authorized to enact new taxes.

## More Aid for Unemployed

Unemployment coverage will hit new peaks this year. James P. Mitchell, secretary of the Labor department, says 1.7 million more workers are covered now than in 1955. More than 40 million U. S. workers are protected. Improvements in compensation laws were made by 42 states and 3 territories in 1955. Maximum weekly benefits range from $24 in Virginia to $36 in New York and $45 in Alaska. Maximums of $30 or more are in effect for almost 70 per cent of all covered workers. The Labor de-

partment is working on a new set of standards to serve as a model for state legislative programs.

### Shortages Hurt

Cross Co., Detroit, says the shortage of hydraulic equipment and large precision bearings is coming close to threatening its machine tool shipments deadlines. Another machine tool builder sounds this warning: "Our shipments will be one-third better than in 1955, if we can get enough steel." The pinch extends through engineering help and skilled labor. Monarch Machine Tool Co., Sidney, O., is having to subcontract some grinding.

### Small Order Headache

Small orders still plague machinery and mill supply companies. Of some 235 members queried by the American Supply & Machinery Manufacturers' Association Inc., Cleveland, 175 say they have a small order problem. Most define a small order as one under $25, though for some, it goes as high as $100. Only 37 of the respondents say they refuse small orders. Repair parts are the big headache for many.

### Room for More Boom

How good is the market for plastics machinery? A. A. Hutchings, vice president sales, F. J. Stokes Machine Co., Philadelphia, says business was so good last year that he doubts if 1956 can equal it. He expects injection press sales to continue strong, but looks for some decline in thermosetting presses. He may find part of his answer in a survey by the Society of the Plastics Industry Inc., New York. Of 232 respondents, 178 say they are planning to expand their production in the next six months.

### Bright Note on Autos

An encouraging slant on auto sales is afforded by last week's Chicago auto show. After three days, attendance hit 192,000, and the goal of 500,000 for the show seemed assured. Said one Ford sales manager: "Our men report 20 per cent more good prospects this year than last year at this time." During rush periods, Pontiac had up to 30 salesmen on the floor and took in names and addresses of 500 prospects. Official consensus of the $10-million affair: New cars still draw a crowd, and there are plenty of buyers for the '56 models.

### Reynolds, Ford Join Forces

R. S. Reynolds Jr., president, Reynolds Metals Co., announced on Jan. 12 that Ford Motor Co. and his company signed a contract for the largest industrial aluminum order in the industry's history. The contract calls for delivery of more than 640 million lb of aluminum over the next ten years, and is renewable at Ford's option. It's planned to deliver the molten metal direct from a new Reynolds reduction plant at Listerhill, Ala., to a new Ford foundry which will be built next to it. Reynolds' facilities will cost from $75 million to $80 million. Power will be supplied by TVA.

# New Westinghouse Purchasing Plan

## Helpful to both buyer and seller

The Purchasing Department of Westinghouse Electric Corporation has initiated a new purchasing program. Through a plan called Operation Co-operation they are developing an open door policy to encourage suppliers to meet with their engineers and others in an effort to learn more about Westinghouse products and methods.

In this way it is expected that suppliers' sales representatives and engineers may be in a better position to help. By giving suppliers every encouragement to ask questions, study shop operations, products, processes, etc., Westinghouse believes its own profits can be increased.

We congratulate the Westinghouse Purchasing Department on this progressive step and are convinced that it will not only build goodwill but will also prove practical and profitable for their good company. It is realized, of course, that many other companies operate along similar lines but this formalizing of the program by a leading purchasing department is of interest and presents a strong challenge to all suppliers to make good on every contact.

We are glad to report that our own Purchasing Department is taking a page from the Westinghouse book and is following very much the same procedure. We are also glad to report that it has always been the Ryerson policy to have our representatives go through years of training within our own organization before going into the field, so that they are well qualified on all steel products and problems.

So, again we congratulate the Westinghouse Purchasing Department and others who have similar programs because we are confident that manufacturing costs will be reduced, products improved and buying and selling costs cut. In total, we believe that our American economy will benefit by "Operation Co-operation".

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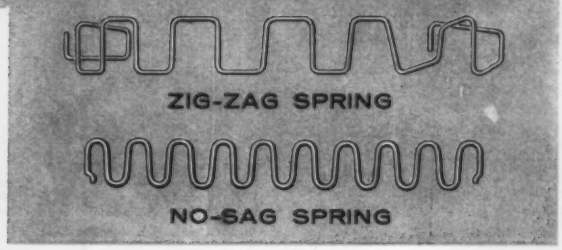


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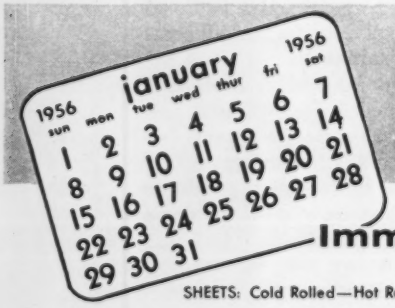


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# Scrap, Too High?

The sensation of the Institute of Scrap Iron & Steel's national convention in Chicago a few days ago was news that top grade heavy melting steel had broken into new high ground in the Youngstown district. Sales hit $62 a gross ton.

After the convention, 1200 brokers and dealers scurried home with this question on their minds: Where's the market headed?

That question was equally important to steel plants and foundries keeping a wary eye on rising costs and to the hundreds of industrial plants interested in getting top dollar for their by-product.

In 1955, the scrap industry had its best year. It generated almost 39 million tons of material, of which 11.5 million tons came from industry, 6.5 million from old autos, 4.5 million from the railroads, 3 million from the farms and 13.25 million from miscellaneous sources. It shipped 34.5 million to steel mills and foundries. The remainder went to Canada, Japan and friendly countries in Europe.

This year, the industry feels there's a chance of beating its record. This optimism is predicated upon three factors: The steel industry matching its 1955 production of 117 million tons; the foundries increasing production 5 per cent to 15 million tons; and the continuance of exports to nations in the western orbit.

The perennially uncertain element in scrap is its price. Scrap is subject to the same whims and fancies as the stock market, with a few added embellishments. It's affected by the state of business, inventories, the weather and whether consumers are in a buying mood.

Fundamentally, the scrap man has no love for high scrap prices. They tie up too much of his capital. They subject him to an inventory loss if the market drops. They mean covering contracts at a loss in a rising market.

Everyone knows that two automatic price stabilizers are always in the background: Higher prices bring more dormant scrap out of hiding, and consumers can lean more heavily on pig iron.

What are the economic facts of life today?

At $53.33, STEEL's scrap composite (Pittsburgh, Chicago and Philadelphia) is up 175 per cent from January, 1941.

Pig iron, at $59 a gross ton, is up 150 per cent. So is nonbessemer iron ore at $10.95. STEEL's finished steel composite, at $128 a net ton, is up 125 per cent.

The conclusion is self-evident. A fair price on scrap is to the mutual benefit of both the dealer and the user.

Irwin H. Such

EDITOR

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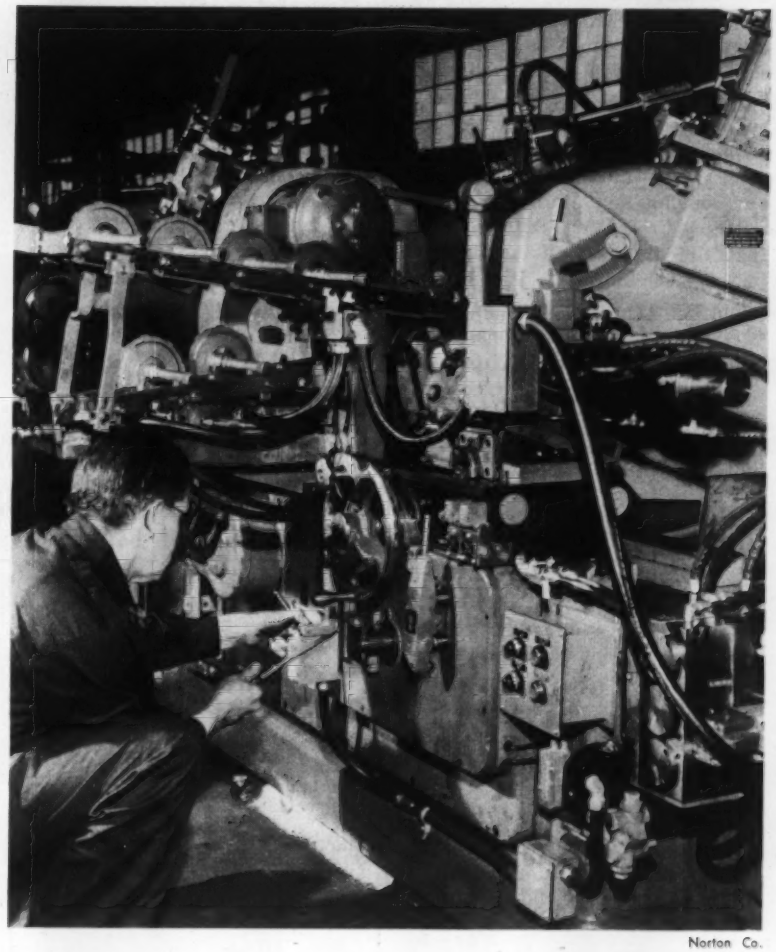


Norton Co.

*As new machine tool orders keep flooding in . . .*

# Builders Up Their Sights

SIX months ago, if you had told a machine tool builder his industry would ring up $1 billion in new orders in 1956, he might have laughed you out of his office. Now, optimism is so high that some reports from top industry sources point to a $1-billion *shipment* year.

Through the first nine months of 1955, new orders were coming at an average of $64 million a month. But in October and November, they shot above the $100-million mark. Though December results still aren't complete, it's a safe bet they'll be just as good. And a spot check shows industrymen believe the level will hold through June.

**Shipments Follow** — Predictions of shipments are closely related to new order levels. Builders are straining to hold down their order backlogs to avoid cancellations. Monarch Machine Tool Co., Sidney, O., is typical. It's working two shifts. Employment is up to over 1100 from 650 at the beginning of last year, and its order backlog has more than doubled.

Gisholt Machine Co., Madison, Wis., predicts its shipments will be up 50 per cent this year over 1955's. Other builders say 30 per cent, 40 per cent, 33 per cent. Lowest estimate is 10 to 15 per cent, and the average, 35 per cent. Projected for the industry, this puts shipments at the $900-million level for the year. At least that much will have to be shipped to hold down order backlogs.

**Boosters**—One reason for the upswing has been the machine tool show—1955 was the first new model year for the industry since 1947. Developing new models and regearing production lines were not painless. Many builders went into the red. "Due to expenses incurred in introducing new models," is seen in many an annual report. Now headaches are turning to smiles. Builders hope to cash in on the show for some years to come.

Automotive retooling for '57 models will play a big part in first-half shipments. Many contracts are still to be let. Complete redesign of its product will cost Detroit about $1 billion for facilities, engineering and tools. Machine tool needs will be up far above the level of the average facelift year.

**Defense**—About the time auto needs start to taper off, shipments to the Air Force long lead-time tool program will come in. As predicted by STEEL last Dec. 5, all the Air Force's $70-million allocation was let by the end of December. Most of these tools will not be shipped until at least the last half of this year, many will carry through into 1957.

And industrymen are expecting that the Navy's turbine and gear program will be completely obligated during the year. That means $60 million in new orders. It's even possible that naval shipyard modernization programs will be launched.

**Politics**—But it's unlikely that defense spending will do better than equal that of 1955. Though the Air Force still needs tools for current production, to place new orders now would only mean adding to backlogs. Further orders could be left until at least the last half of the year without a loss of delivery time. And the Army has

## Machine Tool Shipments Mount

(Millions of Dollars)

Cutting Type Tools Only

| | |
|---|---|
| 1956* | 900 |
| 1955 | 660 |
| 1954 | 892 |
| 1953 | 1191 |

Sources: National Machine Tool Builders' Association
*Estimated by STEEL

little need for more machine tools.

Point to watch: Democrats may try to make election-year capital of Republican handling of the Vance plan. If an investigation seems likely, more money could always be thrown into the machine tool pot. The Defense department is rethinking its machine tool purchase philosophy (see following story on page 39). Few feel that peacetime spending will ever return to the 1953 level—$535 million, which was 45 per cent of industry's output. In 1954 defense-rated shipments were down to $214 million, and fell to $92 million in 1955. Look for a new pattern, with steady year-to-year spending of about $100 million for defense-rated tools. They'll be put to work as soon as delivered.

**Solid Ground** — This forecast isn't deflating builders' optimism for this year. Says Louis Polk, president, National Machine Tool Builders' Association, Cleveland: "With no relief from taxes and other costs in sight and with wage increases a normal part of the economy, the only way a manufacturer can continue to meet competition is by the installation of machines which will increase productivity and reduce cost per piece produced."

Kearney & Trecker Corp., Milwaukee, and other builders are hoping that this philosophy will give them a large share of industry's spending for new plant and equipment, which may jump $3 billion above last year's record. Already, programs are shaping up for March and June placement which bear out this feeling.

**Sellers**—What types of machines are in greatest demand? For some builders, like Norton Co., Worcester, Mass., it's true that "automatic cycle machines are replacing the jobbing machine as the machine tool industry's bread and butter." One of its 1956 grinders (photo on page 37) grinds a shoulder and a diameter simultaneously, has automatic unloading and loading and automatic wheel truing. Cross Co., Detroit, says that the big demand will be for transfer machines.

But you can get as many answers as you ask questions. Ex-Cell-O Corp., Detroit, takes the middle line: "There's a trend towards standard machines with automatic fixturing." Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and Warner & Swasey Co., Cleveland, agree that "standard machines are still the backbone of industry." Says Bullard Co., Bridgeport, Conn.: "There's a definite trend toward wider use of automatic controls, where manufacturing volume warrants the expenditure. But there will always be a place for the manually operated machine."

All agree on the major point—1956 will be a good year. There are two barometers to watch: 1. How fast can the industry get its monthly shipments above the $70-million figure? (which was as high as it was able to go in 1955). 2. Will order cancellations stay at their present low level?

## Deferred Wage Increases

At least 2.75 million workers are covered by long-term contracts that specify the size of wage increase they will receive this year. Of these, nearly 1.5 million are in metalworking — primarily autos, farm equipment and electrical goods.

The Labor department's Bureau of Labor Statistics says most workers in manufacturing and mining industries will get their increases during the second quarter, though some manufacturing groups are scheduled for third-quarter review. Most of some 350,000 transportation workers, employed largely in trucking and local transit, will be boosted in the first quarter of the year.

Among industries in which major wage negotiations are scheduled because of contract expirations or reopenings are: Steel, aluminum, airframes, shipbuilding, petroleum, rubber and the telephone industry.

## Export Quotas Set on Metals

Copper, copper scrap and iron and steel scrap export quotas for the first quarter are the same as they were in the fourth quarter of 1955.

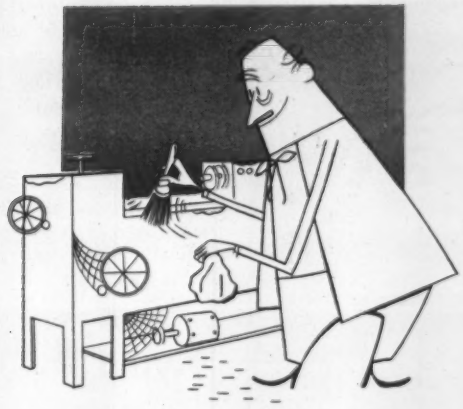
The Department of Commerce quotas are: 3000 net tons for new and old copper scrap; 6000 net tons (copper content) for new and old copper-base alloy scrap containing 40 per cent or more copper; and 600 net tons for copper-base alloy ingots and other crude forms.

Unrefined domestic copper, previously not approved for export, will be licensed on an open-end basis. Open-end licensing of other commodities continues.

## '58 World Copper Capacity: 3.2 Million Tons

**Some Jan. 9 copies of STEEL carried an erroneous table on world copper capacity for the next three years. World-wide expansion will bring these increases: 1956—229,550 tons; 1957—105,500 tons; 1958—123,620 tons. World capacities will be:**

| | (net tons) |
|---|---|
| 1958 | 3,196,667 |
| 1957 | 3,073,047 |
| 1956 | 2,967,547 |



*Old policies get new twist as DOD suggests . . .*

# Put Reserve Tools To Work

IF IT WORKS out, the Defense department's new reserve machine tool and facilities policy will be pointed to as a splendid example of getting the most for the defense dollar. If it doesn't, there will be a lot of "I told you so's."

The new policy does this:

1. Allows tools to be borrowed from mobilization reserves to meet urgent production schedules (under the former schedule, such tools were untouchable except in an all-out defense emergency; new tools were going into storage while the military had to make out with whatever was on hand).

2. Permits each military department to budget for its own tools, including those needed for current programs, mobilization reserves and replacement programs.

3. Provides for an annual review of tools in "packages"—integrated groups or lines of tools needed to produce a specific end item. Review will determine if the package is still needed, its completeness and whether any of the tools in it become obsolete because of technological progress or because of design changes.

**Borrowing**—The borrowing feature will work like this: Say a type X tool is needed to get a new guided missile into production. To get it from industry (with machine tool backlogs what they are) might take 18 to 24 months. So arrangements will be made to borrow that tool from government stand-bys with the understanding it will be replaced just as soon as a similar tool can be procured.

Through the new policy, the Defense department hopes to: 1. Meet changing military mobilization reserve requirements. 2. Insure availability of up-to-date tools. 3. Permit flexibility to get full benefit from new, more efficient equipment and techniques. 4. Train personnel to operate new tools. 5. Have a more realistic basis for reviewing military machine tool requirements. 6. Get rid of the start-stop feature of past military machine tool programs.

The outlook is that there will be no significant change in machine tool buying by the armed forces. But that could change, depending on just how economy minded the Administration and Congress get when it comes to defense appropriations. You can, in fact, get better than even money from some high sources that machine tool buying by the military will be sharply cut back, though more will vote for "no big change."

**Dissent**—The plan is a long way from satisfying everybody. Some of the objections are: 1. It will lead to pirating of existing stand-by production lines (tools will be borrowed and not returned). Integrated reserve facilities will become a thing of the past because of the borrowing and/or because of packages being declared no longer essential.

2. The plan is a way of avoiding spending. Economy-minded defense officials and budget bureau planners won't allow money to be spent to replace borrowed tools.

**Holes**—It is granted by DOD planners that borrowing will leave holes in the packages. But they're working on this premise: "It's better to use the tools where we need them now rather than to leave them locked up somewhere just in case we might need them at some indefinite time in the future." They admit that in an emergency any gaps caused by the borrowing would have to be filled in by scrounging up whatever they could. It's hoped holes will be filled in before such an emergency.

As to whether money will be allowed and borrowed tools replaced, that bears watching.

Details of the new policy are still being worked out. Expected to be among them: A request for an annual appropriation to maintain a reserve fund to buy tools needed to meet emergency production schedules. As money from the fund is spent, a new appropriation would be sought to bring the fund back to its original size (current thinking is for a fund of about $100 million).

## Congress Studies Mergers

Hearings begin today (Jan. 16) on two bills aimed at tightening merger regulations. One bill would require advance notice of the intent to merge (to the attorney general and Federal Trade Commission).

The other bill would give FTC powers (as the attorney general now has) to ask for a preliminary injunction barring a contemplated merger.

## B & T Firms Merge

B & T Machinery Co., an affiliate of Buss Machine Works, Holland, Mich., acquired B & T Engineering & Sales Co., Detroit. B & T Machinery makes zinc and aluminum die-casting machines.

These gage blocks, accurate to ±0.000008-in., verify spacings

# Gagemaking: Up In 1956

SALES of gages and inspection devices may set a peacetime record this year. Hand gages sales could total $40 million, with air gages and other mechanical inspection devices adding another $20 million.

F. O. Hutchinson, vice president of Continental Machines Inc., expects gage block and gaging system sales to equal or exceed the company's best peacetime year, 1955.

He points out that since gage blocks are the ultimate standards by which all inspection gages and instruments are calibrated, sales should reflect the trend for all gaging equipment.

**Confirmation**—W. J. Greene, vice president of L. S. Starrett Co., expects gage sales this year to be up 10 per cent over 1955's. Big buyers of gages and other inspection devices are the government and the automotive, aviation and machine tool industries.

Wallace Carroll, president of Simpson Electric Co., a division of American Gage & Machine Co., Chicago, looks for sales to equal or top his firm's all-time high. He points out that prices were stable this year, but warns 1956 may see a 5-per-cent increase owing to labor and material price boosts.

Gagemakers generally meet the shortage of skilled help by training their own. Says one: "It's a problem that's always with us."

**Automation**—Its effects have yet to make their full impact. One Ohio company that does 25 per cent of its business with automated plants finds fewer hand gages and more air gages are needed.

Mr. Hutchinson says automation is behind the introduction of automatic gaging and segregating devices and the automatic machines that incorporate automatic size control.

He thinks that while the trend to automation may retard the expansion of manual gaging equipment sales, it should provide a broader market for gage blocks and special length standards. Both are essential to the setup and calibration of automatic gaging and automatic sizing machines.

**Better Materials**—Aiding in the fight for accuracy are long-wearing alloys, such as titanium carbide and chrome carbide. Webber Gage Co., Cleveland, uses chrome carbide in a set of gage blocks accurate to one-millionth of an inch. Such blocks are said to last 50 times as long as those made of standard alloys.

# Flying High

## Commercial orders swell aircraft backlogs on West Coast. Los Angeles area gets major share

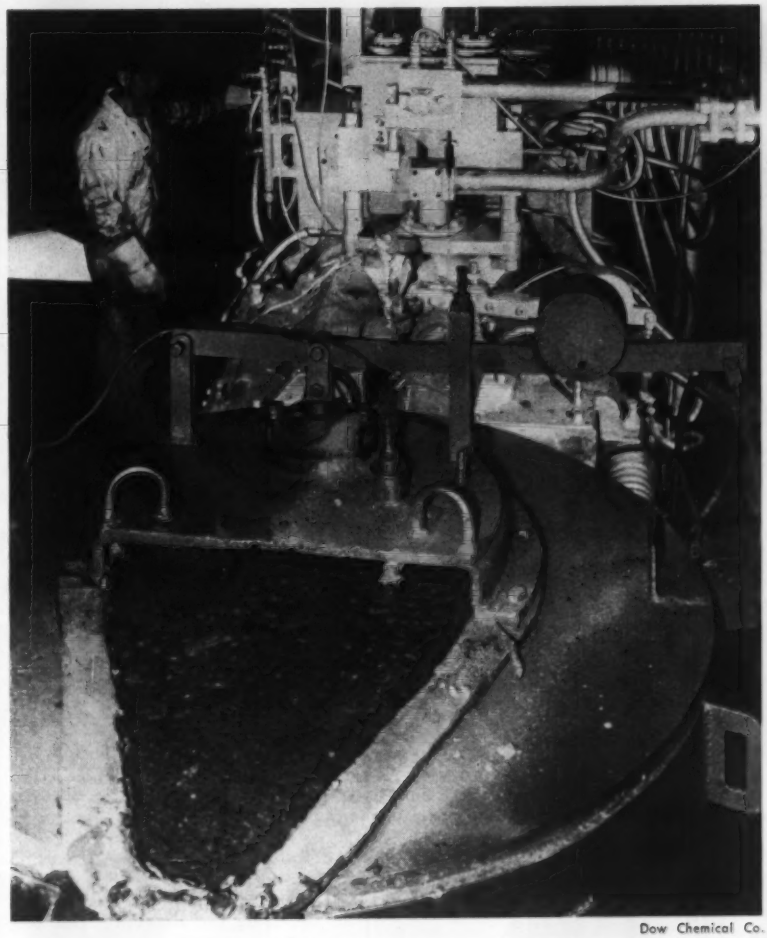
WEST COAST aircraft plants entered 1956 with an aggregate backlog of over $7 billion, up more than $1 billion since the start of 1955. Of significance is the continuing trend toward more commercial orders.

A year ago west coast plants had a commercial backlog of $270 million; today, it has climbed beyond $1.75 billion, and industry officials fully expect $2 billion before the first quarter ends. Most executives say America's entry into the jet transport field is the primary reason.

**Defense**—Production of military aircraft continues high, with present programs scheduled to extend through 1957. The trend in military airpower is to greater speeds, requiring advanced electronic devices to compensate for the slowness of human reactions.

**Influence**—In 1955, the aircraft industry on the west coast employed more than 280,000 people, highest since the peak year of 1943. Aircraft payrolls were $1.25 billion. The Los Angeles area employs about 190,000 people, and has a weekly payroll in excess of $18 million. Aircraft backlog in Los Angeles exceeds $5 billion, with the high increase in commercial backlogs more than offsetting military order declines.

Industry officials believe that this backlog indicates a continuing role for production of aircraft and aircraft parts as the Los Angeles area's largest source of income and its largest manufacturing industry.



Dow Chemical Co.

*Hot chamber diecasting paves the way as . . .*

# Magnesium Expands Market

THE MAGNESIUM industry has been experimenting with hot-chamber diecasting. Result: Magnesium producers have found the key to competitively priced castings and the wedge which may open the door to new and expanded markets.

**Dollars & Cents**—Pricewise, the process can compete with zinc hot chamber diecasting and aluminum cold chamber diecasting.

The new process is fast. Electric motor end frames are being produced with three cavity dies at the rate of 600 an hour. Point to remember: These machines are designed for continuous production. They must produce in substantial volume to keep unit prices competitive.

There are other factors which are pointing toward success for the new process: 1. High casting efficiency reduces inspection costs. 2. Molten magnesium can be handled in steel equipment. 3. The castings cool rapidly after extraction and can be handled with little fear of distorting the piece produced.

**Users**—Automakers are showing increased interest in the future of hot-chamber magnesium castings. Their current uses of them include: Steering column shrouds, brackets, caps and collars; fan spacers; oil seals; window bracket assemblies and signal switch and fuel pump housings.

Appliance manufacturers are purchasing electric motor end frames. The aircraft industry is putting magnesium motor and actuator parts and miscellaneous components into its purchasing schedules.

**Progress**—Dow Chemical Co. has four hot chamber units in operation. A leading automotive parts manufacturer has one in use and plans to install at least five more.

Outlook: The process will continue to be a field of opportunity for magnesium producers. One industry spokesman reports: "Consumption of magnesium diecastings will increase from four to eight times by the end of 1957."

## Venezuela Awards Steel Mill

A contract has been awarded to two Italian firms to build a 420,000-ton steel mill at Puerto Ordaz for the Venezuelan government. The contract price is $173 million, of which $29 million will be paid this year and the remainder in six equal yearly installments. Operations will start in the first quarter of 1958. Full production will be reached in 1959.

The Italian companies are Fiat Societa per Avione and Innocenti Societa Generale per la Industria Metalurgica e Meccanica. They were competing with three U. S. firms (Koppers Co., Pittsburgh; Westinghouse Electrical International Co. and Mesta Machine Co., both of New York). Other bidders included British, German, Belgian, French and Norwegian groups.

The mill will produce rail and basic construction materials during its first stage, when annual production will be 300,000 tons. Increases in these products and additional items like hot and cold sheet, tin plate and galvanized sheet are provided for in the second stage. All raw materials will come from Venezuelan sources.

## Metal Powders Sales Boom

Sales of metal powders soared to 56,000 tons last year, up 20,000 tons over 1954. Iron powder sales rose from 18,000 tons in 1954 to 30,000 tons last year, says the Metal Powder Association.

Turbine rotor will be protected during next production stage by a piece of fiber held in place with pressure-sensitive tape

# Tape Aids Metalworking

WHEN THE MODEL-T was in style, dealers doing touch-up work were hard pressed for masking tape. They even bought large quantities of surgical tape from local druggists. This was a first step toward development of the pressure-sensitive tape industry.

Sales in 1955 topped the $100-million mark. Each year brings hundreds of expanded applications for Scotch, Pres-Stix, Behr-Cat, Mystik and Polyken-type tapes. Since the industry's start (about 1925), some 30 companies have entered the field.

**Uses Grow** — Last year total sales for most companies took substantial jumps as the range of metalworking applications continued to expand. This year will be no exception. Permacel Tape Corp. is making a new tape which simplifies the laminating of metal or transparent sheeting.

Another tape with a bright future: Double-faced tape which is used for holding metals during grinding and cutting, particularly when the metal cannot be easily adapted to clamp-type chucks, vises, etc. The increased use of nonferrous alloys, which do not react to magnetism, call for the use of double-faced tape, too.

**How It's Done**—The tape is laid out on the bed of the magnetic chuck or milling machine bed. The part to be worked is then placed on the tape which can hold the piece securely during the operating cycle, even though coolants may be used. In fact, the part often has to be tapped with a mallet to be removed.

From its beginnings in the automotive field, the extensive use of pressure-sensitive tape has spread to the aircraft, appliance and electrical manufacturing industries. Automakers continue to use the tape for masking, but are finding hundreds of new applications. It is used for winding coils, protecting chrome pieces, covering and holding wires, etc. Bundling small parts and protecting finished surfaces with tape continue to be expanding areas for sales.

**Steel, Too** — Behr-Manning Division, Norton Co., reports that steel manufacturers are using tape for bundling metal coil and strip. Various kinds of pressure-sensitive tape also are being used to protect the edges of cutting tools and stainless steel.

**Future** — Minnesota Mining & Mfg. Co. reports: "Pressure-sensitive tape fits right into the trend toward automation due to its ease of application, holding and bonding characteristics and variety of sizes and colors."

In all phases of metalworking—stamping, fabricating, machining, finishing, welding, etc.—pressure-sensitive tape will continue to find new uses. Why? It helps speed production. It helps reduce unit cost.

# LP Gas Sales: Up, Up, Up

**A 17.2 per cent gain over 1954's record year underlines the boom. Additions to underground storage, proposed and under construction, total 292 million gallons**

PRODUCERS of liquefied petroleum gas have never had a bad year. Look for sales in this one to zoom up about 6,875,000,000 gallons.

Every year has been a record-breaker since the start of the industry in 1922 (sales were 223,000 gallons). Biggest increase was last year, a whopping 880,467,000 gallons.

Behind the sales drive are the advantages of LP gas: High thermal value, economical transportation as a liquid (it expands 270 times when used as a gas) and the supplying of its own pressure feed.

**Increases**—Industrial and miscellaneous uses totaled 431 million gallons in 1955, a 7.3 per cent increase over 1954.

New applications and high business activity kept demand high despite competition from natural gas. LP gas for flame cutting is making gains.

Interest in LP gas for industrial tractors and lift trucks stays high; most of the larger lift truck makers offer factory-equipped models approved by Underwriters Laboratories.

**Big Users**—Domestic and motor fuel sales in 1955 are estimated at 3,661,000,000 gallons by Phillips Petroleum Co., Bartlesville, Okla. This is an increase of 15.3 per cent over 1954. Tank sales, up about 25 per cent, indicate the trend to house heating with LP gas.

Growing fast is the use of LP gas for motor fuel. An estimated 671 million gallons were used in internal combustion engines in 1955. There are over 250,000 LP gas tractors in the U. S.

Tractor conversions to LP gas were up 71 per cent in the first six months of last year. Carburetor sales (tractors excluded) were up 87 per cent. Taxicab fleets also are being converted.

**More Growth**—Sales of LP-gas appliances show a healthy increase. In 1955, range sales were up 11 per cent, water heaters showed a 13-per-cent increase.

Production capacity was increased nearly 850,000 gallons a day by the addition of 22 plants in 1955. This year, it is estimated that 12 new plants will add nearly 500,000 gallons a day to capacity.

## Utilities To Hike Spending

After reaching a peak in 1953, spending on new plant and equipment by electric utilities has been sliding for the last two years. Now it's headed back up for a new record.

According to the Edison Electric Institute, $2.9 billion will flow this year. A little over $1 billion is for new generating plant. For the first time in a decade, these outlays will be topped by spending for distribution facilities. Power companies will plunk down $1.2 billion for copper and aluminum cable, transformers, poles, insulators, etc.

Says Harlee Branch Jr., president of Edison Electric Institute: "Our construction expenditures over the next ten years should average about $3 billion a year, rising to about $4 billion by 1965."

## ODM Issues Tax Write-Offs

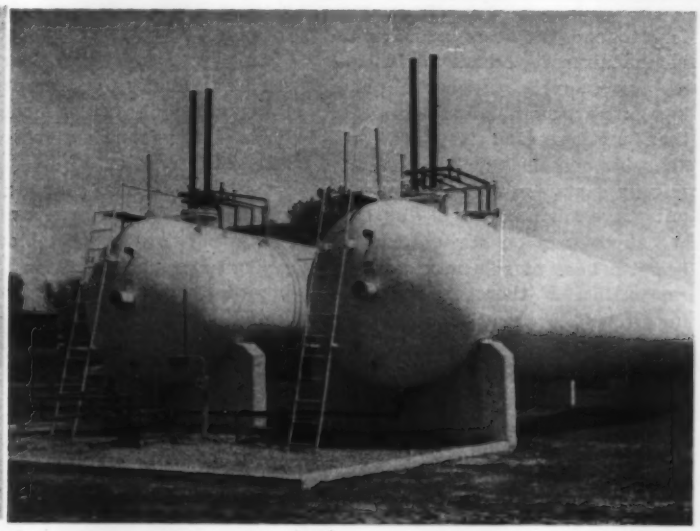
Projects totaling $427,378,199 can be built under certificates for fast tax write-offs issued during the first two weeks in December by the Office of Defense Mobilization.

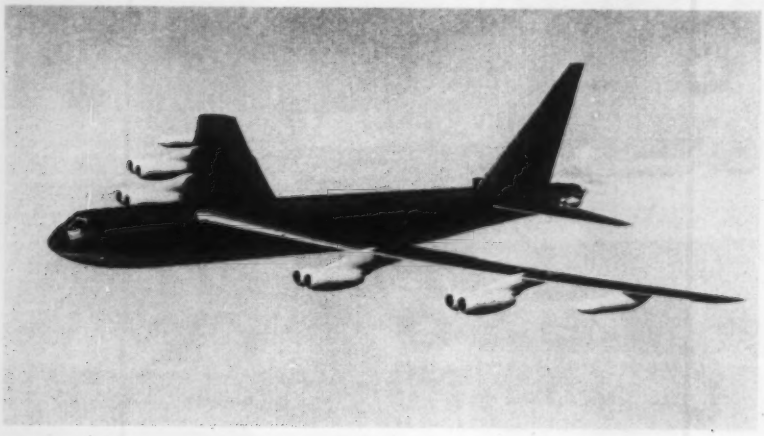
Bethlehem Steel Co. will get a fast tax write-off on a $22-million project for electrolytic steel plate at Sparrows Point, Md.

### LP Gas Sales

| | thousands of gallons |
|---|---|
| 1956 | 6,875,000 |
| 1955 | 6,006,000 |
| 1953 | 4,932,009 |
| 1950 | 3,482,567 |
| 1947 | 2,209,797 |
| 1944 | 1,060,156 |

1956 sales estimated by STEEL
1955 sales estimated by Phillips Petroleum Co.
Other figures from U. S. Bureau of Mines





*Aircraft, missiles have priority in Air Force's . . .*

# Industrial Readiness Planning

THE AIR FORCE has won a major battle—official blessing of its "production readiness" program to replace the traditional concept of a prolonged industrial build-up after attack.

It will mean: 1. Stockpiling of new industrial equipment, at least as far as the Air Force is concerned, is just about down the drain. New equipment will go right to production lines or into new installations instead of into a reserve from which it might take six months or more to get it out and operating.

**Stabilizing**—2. A determined effort to end the feast and famine in the aircraft industry. Instead of, for example, putting a plane into production, building to a peak, then letting production fall off sharply, emphasis will be on attaining a plateau and holding output there till the end of the run.

3. Insistence on maintaining as broad a base of subcontractors as reasonable. If there are cutbacks in aircraft or missile buying, it will be felt proportionately all along the line instead of subcontractors bearing the brunt of it when the prime contractor pulls jobs back into his own plants.

4. Possible Air Force financial aid and/or fast tax write-offs for plant expansions or new facilities.

**Stocking**—5. Inventory build-ups at assembly points of equipment, parts and fabricated components for the most important aircraft, missiles and related equipment. Build-ups at supplier level of raw material and semi-finished components on the same highly selective basis.

6. Contractors will probably be allowed to do more advance buying than at present, possibly smoothing out demands for basic raw materials.

7. Multiple sources of supply will be developed if economically feasible.

**Safeguarding**—Here's what the Air Force hopes to accomplish: 1. Deter war by having a modern Air Force for defense and retaliatory missions.

2. Improve the chances for a maximum of vital weapons makers to survive the first blow of a general war in a condition to start immediate all-out production of selected weapons.

3. Have capacity available to quickly expand output for any "little wars."

4. Maintain the health of the aircraft industry.

**Planning**—Two concepts will be developed: 1. Production Compression Capability—to allow an immediate bulge of production, in emergency, of selected vital weapons. It will call for a maximum work week, draining of the inventory of finished components, equipment and subassemblies on hand at the assembly plant.

2. Production Acceleration Capability calls for a quickly expandable production base ready to go—there would be a steady, continuing build-up rather than a sudden all-out effort as in Production Compression Capability.

**Priorities**—Under the program all weapons will be given a priority. Top will go to certain aircraft, guided missiles and supporting equipment needed for critical missions. Performance and versatility of the weapon will be considered, along with its ability to be produced, vulnerability of producing facilities and inventories.

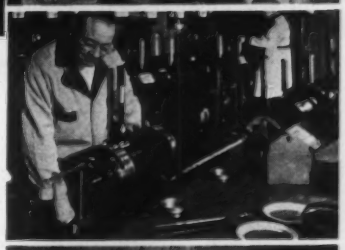
Checks will be made every six months to update planning.

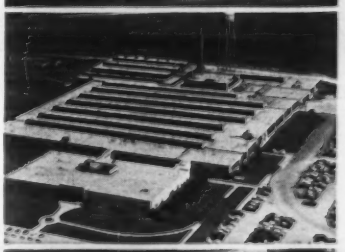
Industrial dispersal will be a key factor in selecting multiple sources of supply, or in construction of new facilities when government money or aid is involved. But the Air Force isn't overlooking the economic facts of life either: Present facilities will be utilized, if possible, before any new ones are built; the need for dispersal will be weighed against the need for timely delivery; the dispersal question probably will be disregarded if facilities require expansion.

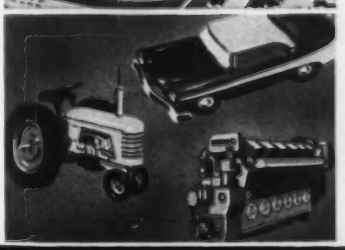
## Here and There

The Atomic Energy Commission is encouraging private industry to build and operate plants to recover usable materials from atomic reactor fuel elements . . . American watchmakers are asking ODM for one-third of the U. S. market "to maintain facilities and engineering and labor skills needed for defense production" . . . The nickel situation is getting a close look, but odds are against any expansion; it's thought the minimum stockpile goal will be reached before new facilities could be brought in and supply then will take care of itself.

# Here's how C/R COOPERATIVE RESEARCH *can help you*







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**DESIGN** . . . When your product is on the drawing board is the time to correlate design and materials with performance requirements. C/R's expertly-staffed engineering groups working in close cooperation with the material labs have done it for others . . . and can do it for you.

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**PRODUCT TESTING** . . . Many products, new and present, need extensive checking. C/R testing labs often work many months to verify designs, eliminate trouble. This is standard procedure on all C/R stock products . . . essential in developing yours.

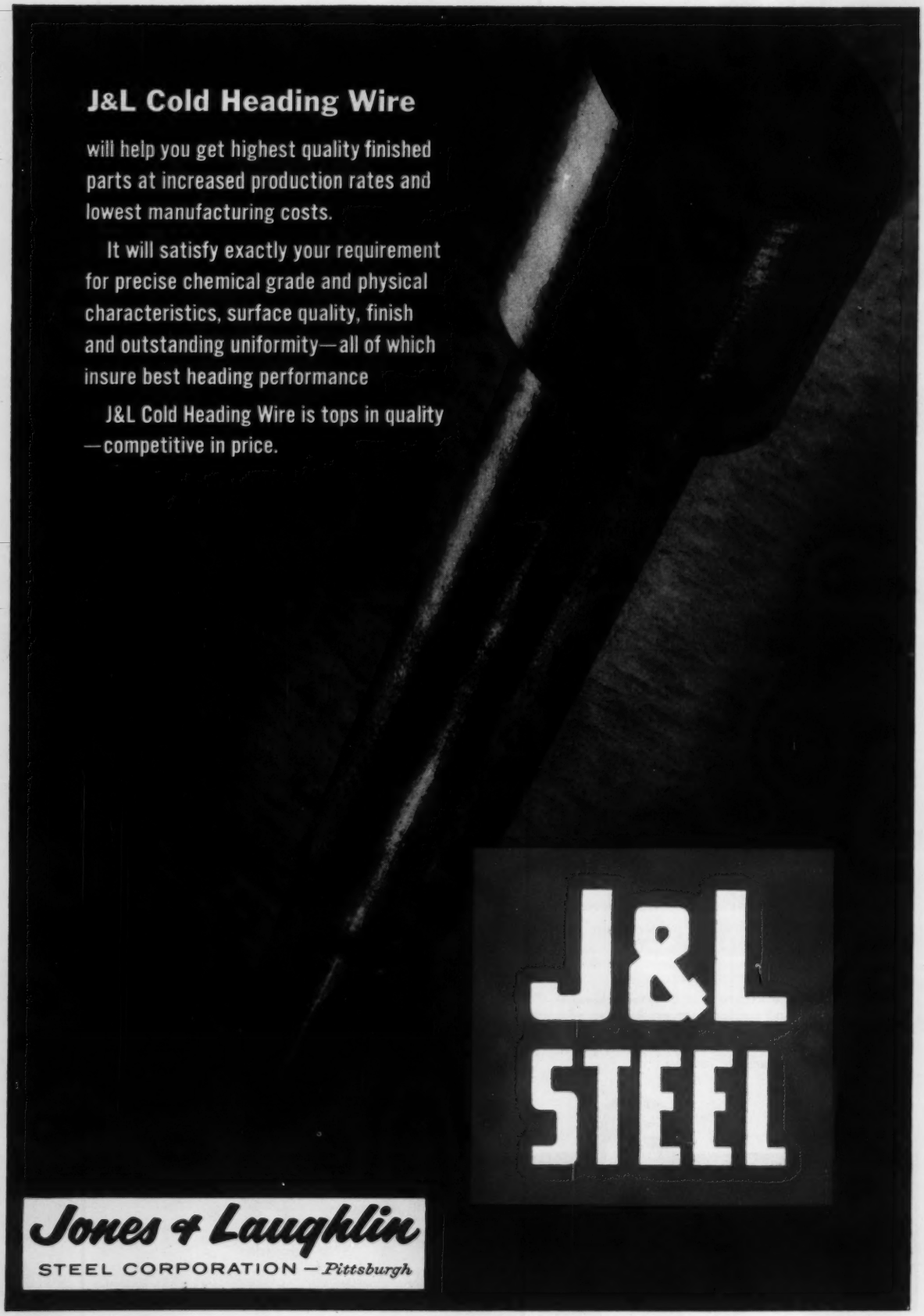
**TROUBLE SHOOTING** . . . Auto and heavy equipment makers, as well as manufacturers in most fields you can think of, have solved difficult sealing and related problems with the help of C/R Cooperative Research. You can, too . . . and save time, trouble and money.

**PRODUCTION** . . . Six plants, operating as extensions of C/R Cooperative Research, provide laboratory-like quality control, timed to your needs. C/R Sales Engineering follows through to coordinate and assure satisfaction.

**EXPERIENCE** . . . Broadest in the field. Proof? More automobiles, farm equipment and industrial machines rely on C/R Oil Seals than on any similar sealing device. C/R diaphragms, boots and gaskets are in the same top categories.

C/R

**CHICAGO RAWHIDE**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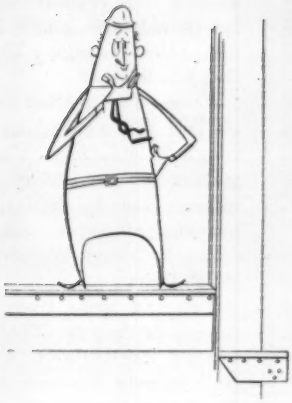
*Management at Work*



# Atlantic's Girdler Sees Whole Picture

DOWN at Atlantic Steel Co., they like to tell the story of the first visit to their plant by Earle C. Smith, Republic Steel's chief metallurgist.

**Visit**—Mr. Smith and his wife were returning from Florida and stopped in Atlanta overnight. Mr. Smith hailed a cab and asked to be driven to the Atlantic Steel plant. He didn't get out of the cab but spent 10 or 15 minutes studying the layout and then told the driver to return to the hotel.

"Now, what in the world was the reason for that?" Mrs. Smith wanted to know.

"I got one of the best lessons of my life out there," replied Earle. "Now I can see why so many good men hit the steel industry out of Atlantic—men like Tom Girdler, Bob Gregg, Zack Collier, Charlie Elliott and a lot of others. Anybody in there has to know all the answers. When they move to a bigger mill, it is just a matter of multiplication."

**Whole Basket**—That's one of the reasons Joseph Hayes Girdler gets such a kick out of his job as vice president of operations at Atlantic.

"Here we have a whole basket of eggs. Maybe they're only pullet eggs, but we see the whole picture of steelmaking."

"When we start to build something, such as our new $8.5-million combination rod and bar mill, it becomes a personal project with all of us. We know that when the new mill is completed next fall, we are going to have one of the most modern in the business. We think we will be able to make the big boys compete with us, instead of trying to compete with them.

"We get a genuine satisfaction from our part in building up southern industry. And, believe me, southern metalworking really is on the move.

"Another nice thing about a small mill is the closer relationship you get with your men. Down here, we think we have a high class of labor, and the productivity figures, compared with other regions, bear us out."

**Atlanta Born**—Joe has a native right to his southern pride. He was born in Atlanta while his father, Tom M., was general superintendent at Atlantic Steel, before going to Jones & Laughlin and later becoming head of Republic Steel. Joe spent ten years in the oil business after being graduated from Lehigh University. He joined Atlantic in 1941 as assistant open-hearth superintendent.

Although Atlantic is in the middle of a substantial expansion and modernization program—including a second large electric furnace just placed in operation, a new main office building, large additions to warehousing facilities and the new rod-bar mill—Joe says it doesn't want to become a big mill. It only wants to be more modern than its competitors.

# Communicating for Profit

**Makers of intercommunication equipment are plugging for more industrial applications. One result: A $30-million business in 1956 for them**

"COSTS DROP when your voice runs your errands," points out Webster Electric Co., Racine, Wis. That idea and others like it will help makers of intercommunication equipment do about a $30-million business this year.

Industry's campaign to cut costs is one reason why intercom producers report 1955 business was up as much as 40 per cent over 1954's and explains why a similar increase is expected in 1956.

**Case**—Reports one user: A close study comparing the cost of a switchboard with that of an intercom saved about $150 a month in the filing department alone. An additional $50 was saved by eliminating telephone callbacks when outside callers needed information not at hand.

Says another: "Office efficiency is up 50 to 60 per cent because 'desk absenteeism' is reduced to a negligible minimum, flow of information is speeded. The primary advantage of the system is that required information is gathered quickly, without confusion and without two or three people having to leave their desks to make a combined report in somebody's office.

"Many quick decisions are obtained by reaching several executives on an intercom conference call; no one has to leave his desk. The number of meetings and conferences is appreciably reduced."

**Summary**—"Advantages of installing an intercom system include: Quick contact with key personnel, rapid transmittal of information; greater office efficiency; reductions in desk absenteeism," sums up Harold Rusten, of Radio Corp. of America's Engineering Products Division, Camden, N. J.

"Think of intercom as your personal telephone circuit without the need of a switchboard or switchboard operator. A flick of a finger places a person-to-person call directly to any individual or group you want to reach in any of your offices, warehouses, plants, stockrooms, shipping docks or yards, leaving your regular telephone free for outside use," says Dan F. Kagan, sales manager, Talk-A-Phone Co., Chicago.

**Price**—Two-station systems may be had for well under $50. "For rough calculations, six cents per station per day will cover not only interest for the initial investment but also all service and operation expenses," says Webster Electric's W. E. Dent.

You can lease from several intercom producers. "Industrial customers, particularly, are interested," reports Norman M. Howden, Stromberg-Carlson Co. "Since under such an arrangement all maintenance and service requirements are our responsibility, this offers many attractions."

**Use**—Versatility of an intercom

# Canadian GE Uses the Intercom as an Industrial Tool

WHEN Canadian General Electric Co. Ltd. moved its power transformer plant from Toronto to Guelph, Ont., the company wanted to solve problems it had in Toronto. Two concerned job timekeeping:

1. A large staff had been required to operate inshop timekeeping centers—but timekeepers spent a lot of time waiting for work.

2. Records at the Toronto plant showed there usually was a delay of two weeks between the finish of a manufacturing operation and the time cost figures were available.

**Speed**—What CGE wanted was a faster data gathering system—one that would provide the cost department with job data as soon as an operation was finished, so the information could be processed and analyzed by management in hours instead of weeks.

At the new Guelph plant, one central timekeeping office was set up, replacing seven inshop timekeeping centers.

**How It Works**—When a worker starts or finishes a job, he walks to the nearest of 27 intercom reporting stations and calls the central timekeeping office. Reporting stations are placed so each worker loses minimum productive time walking to a station and reporting.

The call registers on a control station in the timekeeping office. A timekeeper answers and records the information on the worker's time card. The office handles more than 4000 job changes a week.

**Results** — The system achieved the company's original objectives and gave additional benefits:

1. Labor costs are compiled within 24 hours instead of two weeks; management has current figures to work with.

Source: Executone Inc., New York

system is apparently limited only by the imagination. Here's one way a maker of the equipment, David Bogen Co. Inc., New York, uses intercom in its plant, according to Vinton K. Ulrich, general sales manager: "We connect certain intercoms into the system used for paging and background music. If a person is not at his intercom, by merely pushing another button it's possible to page him over the entire plant system. That's much faster than having our paging operator handle it."

## Railroads To Run Up Big Bill

Railroads have announced some big spending plans for the first three months of this year. The Interstate Commerce Commission's Bureau of Transport Economics & Statistics estimates that they will fork out some $324 million, almost double their spending in last year's first quarter.

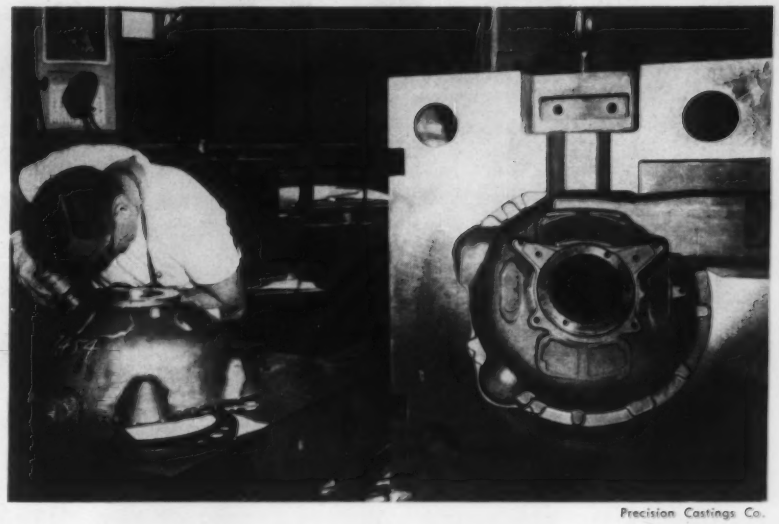
The increase is led by equipment spending, which will account for $232 million of the total. It's up 111 per cent from the 1954 rate. Expenditures on road will be up, too, but only by some 33 per cent.

2. CGE operates with three timekeepers instead of the eleven it would have needed with inshop timekeeping—and two of the three devote most of their time to other work.

3. Workmen have more productive time since they don't spend so much time walking, waiting and visiting when making job reports.

4. Workmen lose less productive time as a result of mishaps like machinery failure or lack of materials. As soon as trouble develops, it is reported over the nearest station.

5. CGE gained 700 sq ft of production space by eliminating timekeeping centers within the plant.



Precision Castings Co.

# Record Shipments Coming?

**Tool and die business will be up at least 10 per cent this year. New model change-overs in auto and other metalworking industries could push volume to all-time high**

TOOL and die shipments will be up 10 per cent this year. Volume is predicted at $750 million or better, equal to the record set in 1953.

Says George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association: "The growing volume of incoming orders and a rising order backlog augur well for continued high level operations in early 1956 for the 2500 contract shops making up the special tool and die industry."

**New Models**—Strong demand should continue at least through the first half. "The even keener competition anticipated in household appliances, office machinery and radio-TV equipment will cause makers of these products to bring out new models as sales ammunition," adds Mr. Eaton.

"Extensive changes expected in the 1957 autos will mean a much greater demand for dies, jigs, fixtures, gages, molds and machines in 1956 than in 1955, when changes were relatively minor."

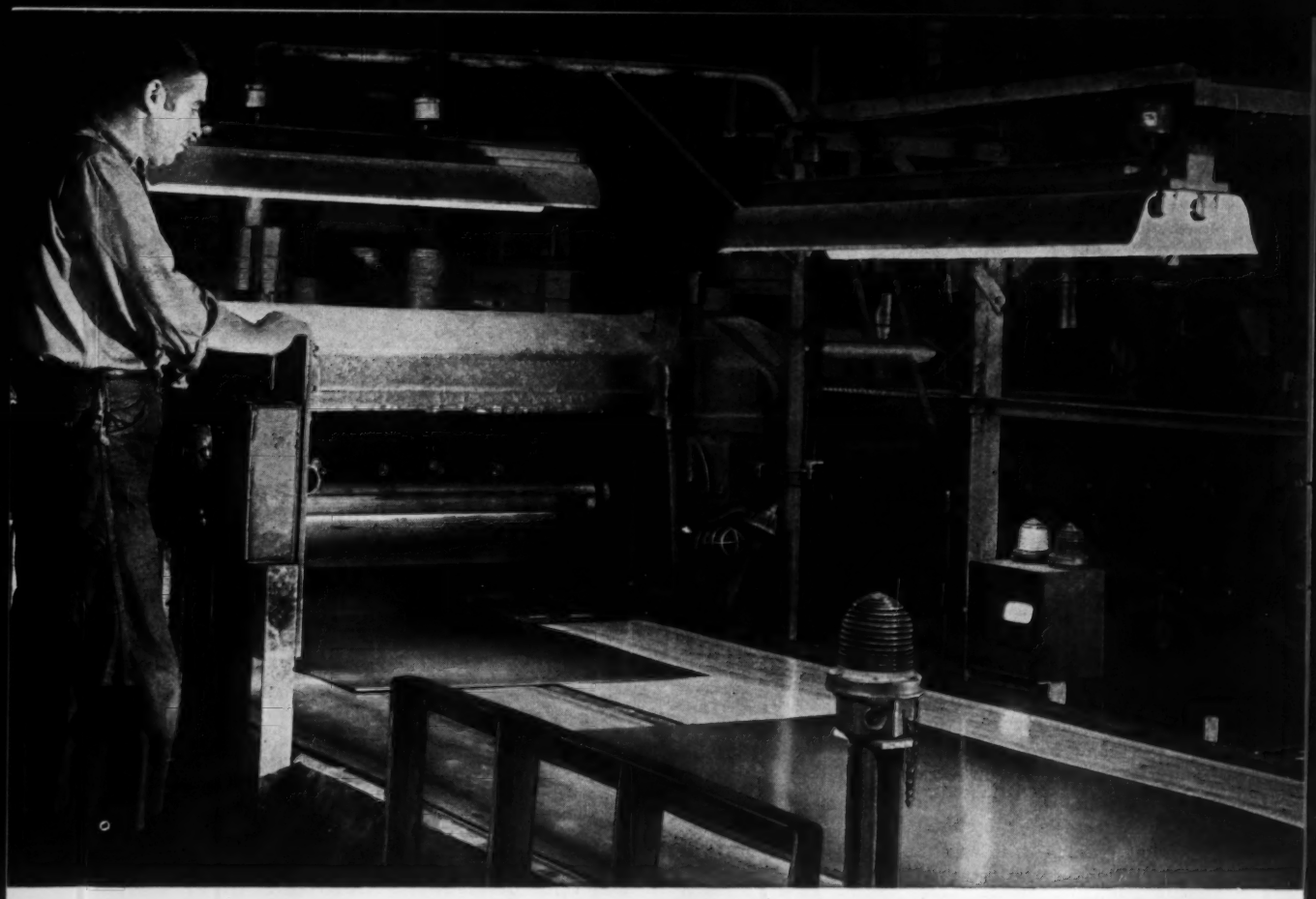
**Defense Factor**—Most of the tool and die industry's orders come from private industry. Exceptions: Aircraft and guided missiles, where there is still much tooling to be done as new models are developed and put into production. A modern jet engine requires 20,000 specially designed and manufactured tools, jigs, dies and fixtures. Half that number sufficed for one of the most powerful piston engines of World War II.

Mr. Eaton concludes that tool and die makers will continue to be a good market for machine tools and other equipment. They must continue to modernize to meet increasing complexity of products.

## New Slant on Piggyback

Fifty "different" freight cars have been bought for the Chicago, Rock Island & Pacific Railroad. Basic concept is a "strong, long-life underframe on which a demountable body can be placed."

Cars can be used not only for piggyback service, using a flatbed highway trailer, but can be turned into gondolas, hoppers, tank cars or even passenger baggage cars by fitting different superstructures.



# How Great Lakes Steel *X-rays* quality

*Above:* Stacking sheets after the X-ray check. *Below:* With dozens of tests passed and uniformity assured, the flat-rolled steel is O.K.'d for wrapping and delivery.

Why do sheets from Great Lakes Steel consistently meet customers' specifications? The X-ray machine is one of the answers. Here an indicator (shown above) signals the thickness of steel sheets as they pass on a conveyor belt. Any sheet failing to meet the established standard is immediately ejected.

Throughout the Great Lakes mills, modern machines and experienced men work together to maintain the consistent quality of our flat-rolled products. Our service includes close contact with customers by Great Lakes representatives, men who are concerned not only with steel production but also with the performance of our steel in the plants of customers.

The next time you have a problem in steel, give us a call. You will find that both quality and service are *consistent* at Great Lakes Steel.

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**NATIONAL STEEL CORPORATION**

*District Sales Offices:* Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

## Where Aluminum Will Be Used On 1956 Cars

| Car | Pounds Per Standard Car | Pounds Per Car with Automatic Transmission | Pounds Per Car with Automatic Transmission, Power Brakes and Steering |
|---|---|---|---|
| Chevrolet 6 | 10.77 | 12.88 | 12.88 |
| Chevrolet V-8 | 13.15 | 15.26 | 15.26 |
| Pontiac V-8 | 14.32 | 33.30 | 33.30 |
| Oldsmobile V-8 | 16.51 | 36.67 | 50.80 |
| Buick V-8 | 19.97 | 58.98 | 59.28 |
| Cadillac V-8 | —— | —— | 63.05 |
| Cadillac Eldorado | —— | —— | 191.55 |
| Ford 6 | 14.16 | 31.39 | —— |
| Ford V-8 | 17.27 | 34.50 | —— |
| Mercury V-8 | 19.84 | 40.67 | —— |
| Lincoln V-8 | —— | 58.04 | 58.29 |
| Continental Mark II | —— | —— | 65.52 |
| *Plymouth 6 | 17.58 | 53.58 | 64.53 |
| Plymouth V-8 | 21.23 | 57.23 | 68.18 |
| Dodge 6 | 20.35 | 56.35 | 67.30 |
| Dodge V-8 | 23.30 | 59.30 | 70.25 |
| DeSoto V-8 | —— | 62.20 | 73.15 |
| Chrysler V-8 | —— | 65.17 | 76.12 |
| Imperial and Crown Imperial | —— | —— | 80.53 |
| Packard V-8 | 19.80 | 78.30 | —— |
| Studebaker Champion 6 | 9.26 | 13.26 | —— |
| Studebaker Commander V-8 | 14.53 | 18.53 | —— |
| Studebaker President V-8 | 14.53 | 18.53 | —— |
| Studebaker Classic | 18.17 | 22.17 | —— |
| Studebaker Golden Hawk | —— | 76.92 | —— |
| Nash and Hudson Rambler | 24.32 | 38.09 | —— |
| Nash Statesman | 22.27 | 33.05 | —— |
| Nash Ambassador 6 | 23.84 | 40.48 | —— |
| Nash Ambassador V-8 | 24.30 | 82.70 | —— |
| Hudson Hornet V-8 | 18.80 | 77.20 | —— |
| Hudson Wasp | 17.86 | 26.59 | 26.92 |

*Chrysler figures do not include its production of convertibles which use an additional 25 lb of aluminum per car for roof bows and roof actuating mechanism

# More Aluminum For Autos

ALUMINUM is a bigger word than ever in the automobile industry, says the Aluminum Co. of America, Pittsburgh.

Alcoa's survey shows that 1956 models are using 16 per cent more aluminum than did the '55 editions. The average number of pounds of aluminum per car has stepped up from 29.6 in '55 to 35.2 this year. That means a record-breaking 246 million lb of aluminum will be used in 1956 passenger cars—if carmakers hit a production target of 7 million automobiles.

**Estimates**—Harry L. Smith Jr., Alcoa vice president for sales development and market research, points out that studies indicate aluminum applications on autos will rise to 49.8 lb by 1960; 81 lb by 1965. He adds: "If aluminum were applied to every possible automotive use, total poundage on each car would top 300 lb." That's quite a jump from Alcoa's earlier estimate in June, 1955, of 262 lb.

**Where It Goes** — According to Mr. Smith, part of the increase comes from more use of aluminum exterior trim. Right now, 7 per cent of automobile aluminum is used for trim. Look for that amount to almost double on '57 models. Anodizing processes mean that more colorful trim strips and grilles will be made of aluminum.

**Transmissions** — Almost 50 per cent of the aluminum goes into automatic transmissions. A good example are Buick V-8s. Only 19.97 lb of aluminum per car is used on a standard Buick. Adding the automatic transmission boosts aluminum in each car to 58.98 lb. Part of that jump is because General Motors changed transmission design to use another 14 lb of the light metal in its automatic jobs.

The growing popularity of push button shifting will probably write finis to standard shifts. It's a matter of time before automatic transmissions with aluminum parts will be a must item for every auto.

**Engines** — Some 30 per cent of total aluminum usage is for engines. With more and more gadgets being crammed into the front ends of today's cars, engineers are counting on aluminum to lighten the load.

Aluminum pistons are now common. Next, watch for aluminum cylinder heads, since higher compression ratios favor the heat dissipating qualities of aluminum.

**Breakdown** — Although engines, transmissions and trim account for most aluminum, wiring, brakes, power steering and plenty of fasteners are other spots where the lightweight metal is moving in.

Chrysler Corp. cars average 350 aluminum parts per car on all 1956 models and styles. General Mo-

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Cantilever top gives the Chrysler Plainsman its "long look"

tors cars average 73 parts and Packards and Packard Clippers 33 —25 in the transmission. The other eight parts are pistons. Total weight is 63.5 lb. The Eldorado, by the way, uses more aluminum than any other car—191.55 lb, with all extras added.

Packard, which this year switched to an aluminum die cast transmission housing, substantiates Alcoa findings that die casting is the popular production method for aluminum parts. New models average 15.7 lb of aluminum die castings per car compared with 12.3 lb of die cast parts in 1955.

**Radiators**—Alcoa predicts that the next big advance for aluminum will be in radiator fins. Nash Ramblers had them in '55, but people in the business say there still are plenty of headaches.

**Cost Matters** — As one expert puts it: "Aluminum may not be better than copper for radiators, but if it costs less and is easier to get, it will be used."

If the copper situation eases this year, as it shows signs of doing, aluminum may receive a setback in the radiator section. As far as an all-aluminum radiator is concerned, best guesses are it won't come until engineers have a lot more answers to such problems as corrosion and stopping leaks in the tubes.

**Hot Spots**—Spurred on by forged aluminum wheels which appeared last year on Cadillac's Eldorado, Alcoa predictors offer aluminum brake drums as another automotive possibility.

Cautious engineers, however, suggest that right now installation wouldn't justify manufacturing costs.

**Bearings**—One of the more interesting uses of aluminum was reported last week at the Society of Automotive Engineers' annual meeting in Detroit.

R. S. Frank and W. J. Lux, Caterpillar Tractor Co., Peoria, Ill., pointed out that solid aluminum alloy and steel-backed aluminum bearings are excellent for high speed, high load applications. They've been tested on Caterpillar tractors since the end of World War II. Long an experimental item in the industry, but with little actual use, aluminum bearings show more possibilities in the near future.

## U. S. Auto Output

Passenger Only

| | 1955 | 1954 |
|---|---|---|
| January | 659,719 | 456,765 |
| February | 675,769 | 443,257 |
| March | 794,188 | 526,076 |
| April | 754,007 | 533,470 |
| May | 724,891 | 494,250 |
| June | 649,372 | 504,811 |
| July | 659,979 | 441,451 |
| August | 614,392 | 436,650 |
| September | 461,592 | 285,860 |
| October | 517,669 | 236,635 |
| November | 748,559† | 508,466 |
| December | | 641,971 |
| Total | | 5,518,662 |

| Week Ended | 1955 | 1954 |
|---|---|---|
| Dec. 10 | 178,409 | 148,692 |
| Dec. 17 | 169,256 | 151,924 |
| Dec. 24 | 150,881 | 124,854 |
| Dec. 31 | 105,670 | 124,250 |
| | 1956 | 1955 |
| Jan. 7 | 122,919† | 150,585 |
| Jan. 14 | 144,000* | 155,109 |

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

## Chrysler at Chicago

Chrysler Corp. went to the Chicago Motor Show last week and took the wraps off its experimental station wagon, the Plainsman.

Aimed at the suburbia population, the Plainsman boasts an overall length of 208 in. and is 60.2 in. high. It has a 115-in. wheelbase. Power supply is a special Chrysler V-8 engine with PowerFlite transmission.

Since the Chicago show primarily is a place to show off design ideas, the Plainsman sported such novelties as an electrically operated tailgate and a rearward facing third seat. Spare tire is hidden in the right rear fender panel.

Another Chrysler product, and one which can be bought—eventually—is the Plymouth Fury. Supposedly a high performance sports car, the Fury retains all deluxe conveniences. Its 240-hp V-8 engine has a 303-cu-in. displacement, and a 9.25:1 compression ratio. Gold anodized aluminum grille and special stainless steel wheel covers add a note of distinction.

Only a handful have been made so far, but for those who want sports car performance with passenger car comfort, the Fury will be available in '56.

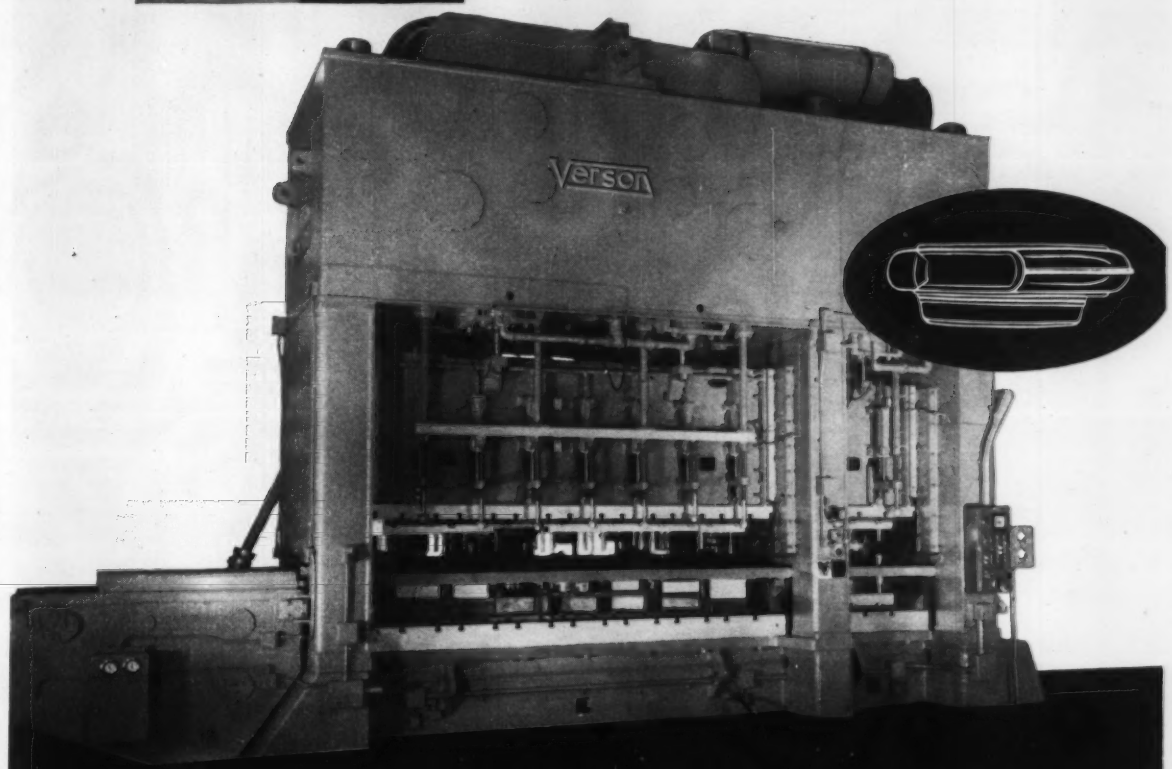
## The Packard Predictor

Studebaker - Packard Corp. brought its futuristic push button experimental model to Chicago, too. Designed as a Packard, the Predictor points up some touches which may be along pretty quickly as designers keep pushing car roofs toward the pavement.

One item: Doors which extend into the roof. As the door opens, electrically operated swivel seats swing out while the roof portion of the door rolls back like a desk top.

Powerwise, the Predictor has a 310-plus hp V-8 engine with 374 cu-in. displacement.

# this Verson TRANSMAT PRESS




*is producing* **1000 automotive air cleaner shells per hour automatically**

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Verson Transmat Presses offer unusual economy and efficiency whenever four thousand or more pieces, requiring four or more operations, are produced per day. Essentially a single press with multiple die stations and separately adjustable slides, the Transmat transfers the work piece by mechanical fingers synchronized with the press action. Feeding can be from coil stock or blanks. Intermediate handling, pickling or annealing is unnecessary.

The Verson Transmat is more than a press . . . it is a production process that can substantially reduce unit costs on a wide variety of mass produced stampings. Whatever your requirements, however — from several hundred to many thousand stampings per day — we will be happy to recommend the production process best suited to your needs. For specific recommendations, send an outline of your production problem.

*A Verson Press for every job from 60 tons up.*

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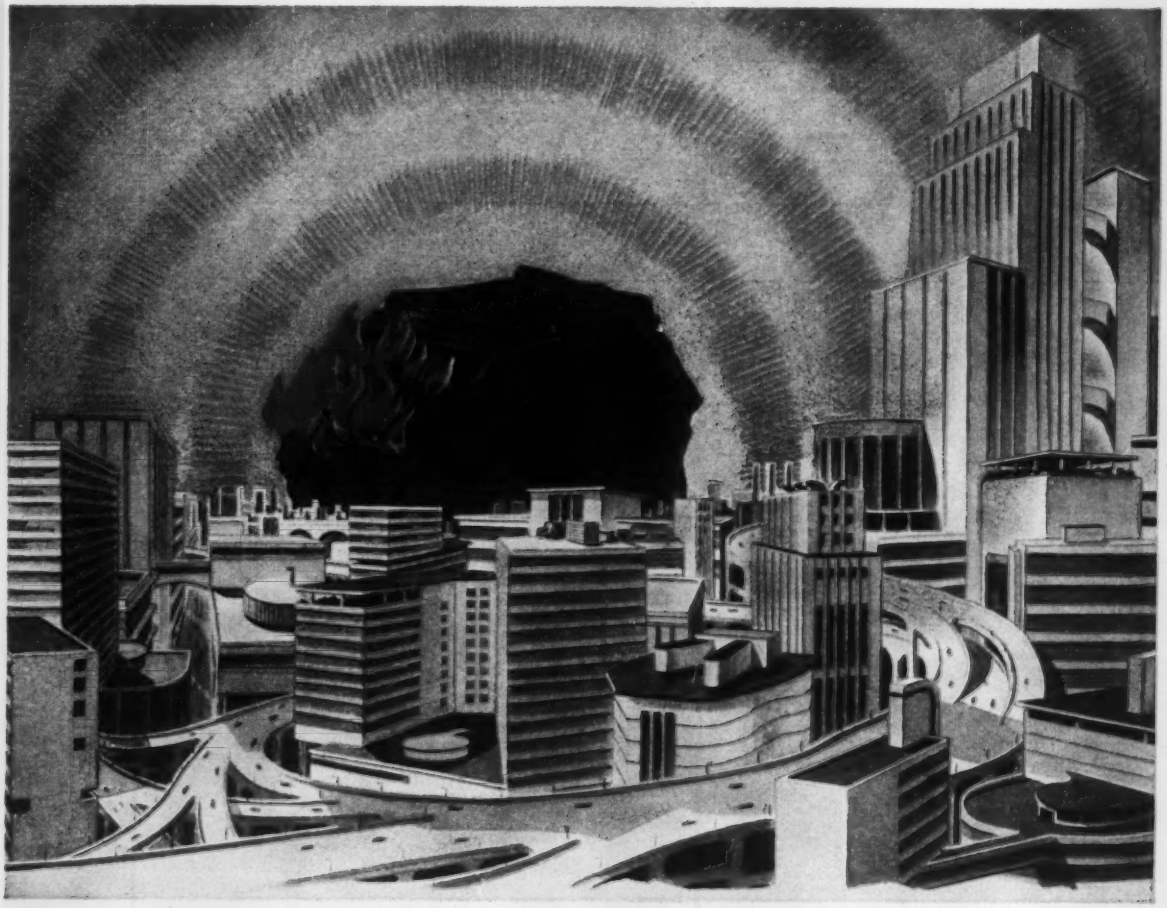

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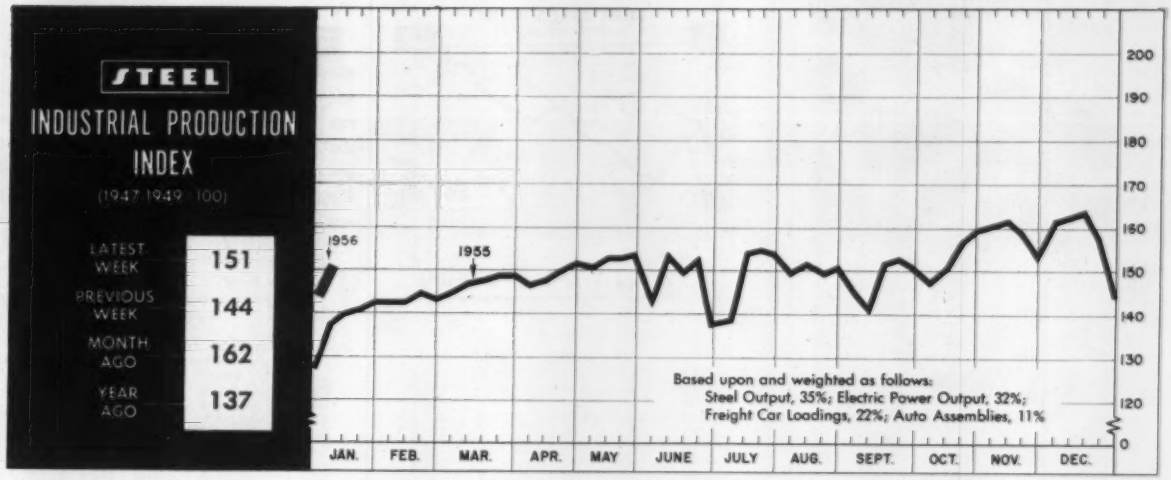



Week ended Jan. 7

# Auto Cutbacks Keep Business Guessing

AUTOMOTIVE output is being watched for clues to general business activity in 1956 even more than it was last year. In 1955 there was nothing but optimism over the industry's prospects; this year, industry spokesmen lack that bullishness.

Speaking before a meeting of representatives of major underwriting houses in New York, Henry Ford II said he was "reasonably sure" 1956 will not be so good as 1955 for Ford Motor Co. He joined a growing chorus of major automotive executives who view this new year with conservatism.

**Cutbacks** — Carrying over from December, the concern over increasing dealer stocks of new cars is resulting in cutbacks in production which could continue for several weeks. *Ward's Automotive Reports* says that dealers have a 33-day supply, or about 725,000 new cars. This compares with the 16.1-day supply at the turn of 1955. Even if a sales pickup should develop in January—and dealers say it is—production could still remain at comparatively low levels without doing too much harm.

Ford and Chrysler Corp. are leading the cutbacks. Ford will lay off 1657 hourly workers at its River Rouge plant during January and February as the company returns to a 40-hour week. The Mercury Division, frankly admitting that demand is off, is also cutting output. In addition to long holidays over Christmas and New Year's, Chrysler pulled in on some of its divisional operations during the first week of January, reflecting the softening in the market. General Motors Corp. held to planned schedules. Despite current slowdowns, this could be a 2-million-unit quarter, which by any standards other than 1955's would be terrific.

## Construction Eases Into 1956

Construction entered the new year with little more than casual notice after setting the second

### BAROMETERS OF BUSINESS

| | LATEST PERIOD* | PRIOR WEEK | YEAR AGO |
|---|---|---|---|
| **INDUSTRY** | | | |
| Steel Ingot Production (1000 net tons)[2] | 2,388 | 2,403 | 2,007 |
| Electric Power Distributed (million kw-hr) | 11,400[1] | 10,751 | 9,425 |
| Bitum. Coal Output (1000 tons) | 9,100 | 10,280 | 7,430 |
| Petroleum Production (daily avg—1000 bbl) | 6,900 | 6,987 | 6,343 |
| Construction Volume (*ENR*—millions) | $160.5 | $276.8 | $414.9 |
| Auto, Truck Output, U. S., Canada (*Ward's*) | 147,474 | 122,118 | 177,877 |
| **TRADE** | | | |
| Freight Car Loadings (1000 cars) | 550[1] | 575 | 602 |
| Business Failures (Dun & Bradstreet) | 185[1] | 174 | 198 |
| Currency in Circulation (millions)[3] | $31,152 | $31,415 | $30,434 |
| Dept. Store Sales (changes from year ago)[3] | +11% | +22% | −1% |
| **FINANCE** | | | |
| Bank Clearings (Dun & Bradstreet, millions) | $22,862 | $18,909 | $22,957 |
| Federal Gross Debt (billions) | $280.8 | $280.7 | $278.8 |
| Bond Volume, NYSE (millions) | $16.9 | $14.9 | $31.2 |
| Stocks Sales, NYSE (thousands of shares) | 9,632 | 9,007 | 22,946 |
| Loans and Investments (billions)[4] | $86.7 | $86.8 | $86.5 |
| U. S. Govt. Obligations Held (billions)[4] | $30.1 | $30.3 | $36.9 |
| **PRICES** | | | |
| STEEL's Finished Steel Price Index[5] | 208.90 | 208.90 | 194.53 |
| STEEL's Nonferrous Metal Price Index[6] | 273.2 | 270.1 | 215.8 |
| All Commodities[7] | 111.5 | 111.4 | 110.9 |
| Commodities Other than Farm & Foods[7] | 119.6 | 119.6 | 114.8 |

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

...new Cincinnati Finishing System at NuTone

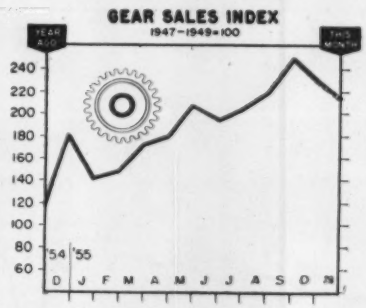
This automatic painting and baking system, designed by CINCINNATI for NuTone, Inc., world-famous manufacturer of door chimes, ventilating fans and kitchen hoods, has increased production, sharply slashed finishing costs and doubled capacity per square foot area. Paint consumption is reduced to from 35 to 50% of what was formerly required.

Add to this a substantial increase in production, and you realize the higher efficiency NuTone has achieved, while saving more than $900 per week!

Let a CINCINNATI Cleaning and Finishing engineer take a look at your finishing costs. He'll give you a no-obligation analysis that can point to real savings for you.

Write today!

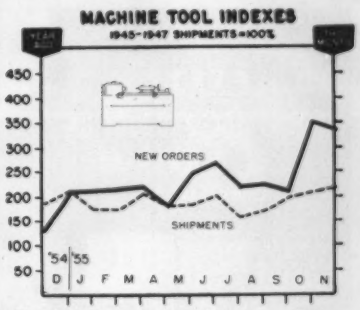
Cincinnati




| | 1955 | 1954 | 1953 |
|---|---|---|---|
| Jan. | 140.9 | 167.4 | 161.4 |
| Feb. | 148.5 | 165.1 | 188.1 |
| Mar. | 172.8 | 128.6 | 158.9 |
| Apr. | 179.8 | 158.2 | 217.1 |
| May | 205.2 | 132.5 | 189.8 |
| June | 193.5 | 127.4 | 146.5 |
| July | 201.7 | 141.3 | 120.7 |
| Aug. | 217.6 | 154.7 | 121.6 |
| Sept. | 246.5 | 135.1 | 135.6 |
| Oct. | 227.6 | 152.3 | 211.1 |
| Nov. | 210.4 | 116.7 | 144.9 |
| Dec. | .... | 182.2 | 194.0 |

American Gear Mfrs. Assn.

Charts copyrighted, 1956, STEEL




| | New Orders 1955 | New Orders 1954 | Shipments 1955 | Shipments 1954 |
|---|---|---|---|---|
| Jan. | 203.0 | 173.5 | 167.3 | 319.4 |
| Feb. | 209.4 | 159.8 | 168.2 | 323.1 |
| Mar. | 214.6 | 169.6 | 202.5 | 327.2 |
| Apr. | 178.1 | 142.8 | 180.1 | 302.7 |
| May | 243.7 | 139.5 | 180.9 | 270.3 |
| June | 263.2 | 185.2 | 198.8 | 276.3 |
| July | 217.8 | 124.7 | 152.9 | 205.7 |
| Aug. | 221.3 | 147.9 | 164.6 | 203.7 |
| Sept. | 207.3 | 180.9 | 195.4 | 213.4 |
| Oct. | 347.1 | 148.9 | 204.2 | 191.0 |
| Nov. | 432.7* | 119.5 | 214.6 | 179.5 |
| Dec. | .... | 202.9 | .... | 203.4 |

*Preliminary
National Machine Tool Builders' Assn.

highest monthly total for contracts in December. *Engineering News-Record* reports a total of $1.693 billion worth of awards, second only to a $2.4-billion month recorded in 1950, which included an atomic plant contract for almost $1 billion. December's total was well above the November figure of $1.369 billion, and ran the full-year tally up to a record $18.7 billion, 30 per cent above last year. Public works led the way last month, with state and municipal contracts showing strength. Private work was off sharply on a weekly basis.

Because there were only four business days in the first week of January, the new year got off to a slow start. Heavy construction awards came to only $160.5 million, well below both the previous week (only three days because of Christmas) and the full week a year ago.

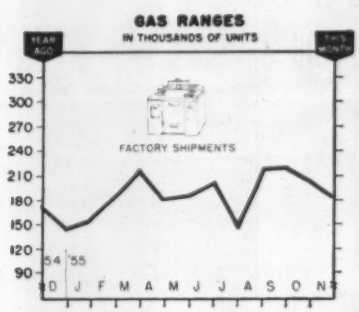
The cost of construction is still on the upgrade. *Engineering News-Record's* construction cost index is at a record high of 676.36 (1913=100), mainly because of increased cement and lumber prices. Aberthaw Construction Co. says its index of the cost of industrial building advanced in the fourth quarter, 1955, from 399.4 to 400.7.

## Railroad Earnings Up

Railroads are reporting far better incomes through November, 1955, than for the corresponding period in 1954. Class I railroads in November had an estimated net income of $80 million, compared with $77 million in the 1954 month. Net income for the first 11 months of 1955 rose to $830 million from $562 million in the previous year. These earnings are reflected in loading of revenue freight cars for the full year of 1955 as tabulated by the Association of American Railroads. Last year saw an increase of 3,968,590 cars, or 11.7 per cent, over 1954. Even the last week of December, which included the Christmas holidays, showed an 8.6-per-cent increase over the corresponding week of 1954, which had no holiday.

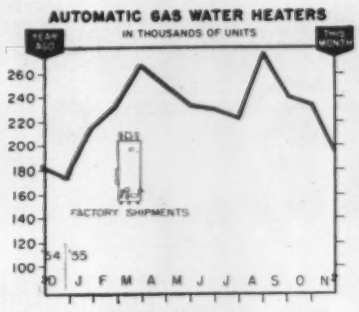
## Index Takes Holiday Dip

The net result of the holiday season was a decrease in STEEL's industrial production index to 144 (1947-1949=100) for the week ended Dec. 31, with an expected recovery to about 151 for the following week. The steel industry was the stabilizing factor, turning out 2,309,000 net tons of steel for in-




| | Shipments—Units | | |
|---|---|---|---|
| | 1955 | 1954 | 1953 |
| Jan. .... | 152,900 | 137,000 | 169,200 |
| Feb. .... | 186,200 | 152,900 | 185,900 |
| Mar. .... | 217,300 | 188,200 | 208,200 |
| Apr. .... | 182,300 | 172,400 | 220,300 |
| May .... | 187,400 | 163,800 | 181,000 |
| June .... | 203,900 | 174,300 | 166,600 |
| July .... | 145,700 | 134,500 | 159,000 |
| Aug. .... | 218,600 | 179,400 | 186,800 |
| Sept. .... | 217,700 | 203,900 | 209,500 |
| Oct. .... | 205,600* | 197,100 | 203,900 |
| Nov. .... | 182,000* | 174,000 | 158,500 |
| Dec. .... | ..... | 147,300 | 134,400 |
| Total .... | ..... | 2,024,800 | 2,183,300 |

*Preliminary
Gas Appliance Mfrs. Assn.




| | Shipments—Units | | |
|---|---|---|---|
| | 1955 | 1954 | 1953 |
| Jan. .... | 210,900 | 164,400 | 189,900 |
| Feb. .... | 228,400 | 175,000 | 194,200 |
| Mar. .... | 263,100 | 187,800 | 207,400 |
| Apr. .... | 245,200 | 200,800 | 209,500 |
| May .... | 229,400 | 195,600 | 183,300 |
| June .... | 227,100 | 206,700 | 181,200 |
| July .... | 219,300 | 190,300 | 178,900 |
| Aug. .... | 275,600 | 207,100 | 168,100 |
| Sept. .... | 237,100 | 205,500 | 179,000 |
| Oct. .... | 231,200 | 202,000 | 194,300 |
| Nov. .... | 192,500* | 179,100 | 155,000 |
| Dec. .... | ..... | 166,800 | 141,900 |
| Total .... | ..... | 2,281,100 | 2,182,700 |

*Preliminary
Gas Appliance Mfrs. Assn.

gots and castings during the former week and 2,403,000 net tons the latter. Estimated production for the week ended Jan. 15 was 2,388,000 net tons, according to the American Iron & Steel Institute. That is equal to 97 per cent of capacity. Electric output, which dipped during the holidays, still maintained a rate about 14 per cent above 1954's at the year end.

## PAs Look for Good Year

That business in general in 1956 is going to continue on a high plane is affirmed by the December survey of the Purchasing Agents Association of Chicago. Salient points: Deliveries of materials are getting faster than they were in November. But prices showed a marked increase in the "higher" category. Inventories remained about where they have been the last three months, but 65 per cent of the members said they were up as much as 100 per cent over a year ago. However, 78 per cent reported that their inventories were in about the proper relation to contemplated first-quarter, 1956, sales. The majority of PAs said that employment was the same as in November, while production continues a three-month trend away from the "higher" bracket. About 56 per cent reported production on an even keel with the previous month. Backlogs remained the same for more purchasers in December than at any other time in the last half of 1955. Eighty per cent are sticking with the 30-90-day range on buying policies. All but 13 per cent said that business, from the standpoint of profit, is the same or better than it was in the preceding month.

## Income and Credit Rise

Personal income and credit spending remained at high levels near the close of 1955. The Office of Business Economics, U. S. Department of Commerce, reports that personal income in November was at an annual rate of $311.5 billion, or about $2 billion higher than in October. The bulk of the increase was in private industry wages and salary disbursements. The Federal Reserve Board said that installment credit rose $284 million in November, but for the first time in 1955 automobile paper was not the main cause. Other consumer goods, such as refrigerators, ranges and appliances, were mainly responsible.

• Edited by GEORGE BLACK

### VALVE CLINICS

In spite of our belief that the Cooper Alloy stainless steel valve offers the best in design and operating features, we take it to school regularly. This "school" consists of continual study by field engineers, design engineers and by industry itself subjecting it to intensive examination and reporting their findings at organized Valve Clinics.

Cooper Alloy Valve Clinics have been held in dozens of leading plants, including Dow, DuPont, Mathieson, Celanese, Pfizer and many others. Arrangements for such a clinic in your own plant may be made through our Public Relations Division.

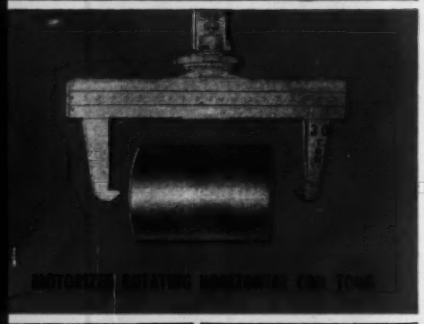
### "FLEX-ALLOY" STAINLESS PUMP

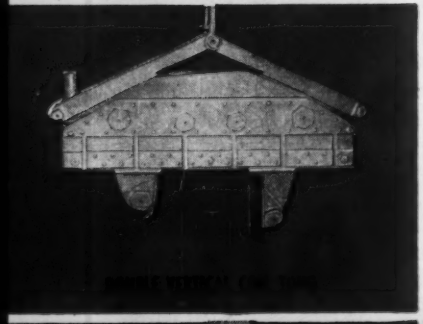
A new line of stainless steel rotory pumps for corrosive solutions, abrasive slurries and fluids which must be kept free from contamination has just been announced by our Vanton Pump & Equipment Division. Called "Flex-Alloy" these new pumps in type 304 or 316 stainless (other alloys on request) incorporate the same no-stuffing box, no-shaft seals, no-gasket features of the popular "flex-i-liner" plastic pump series. Full details are given in Bulletin VP561.

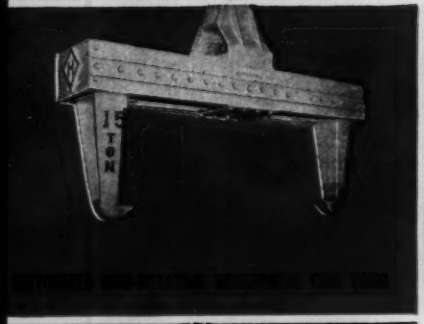
### FAST AND COLD

On October 14, 1947, the Bell X-1 made history by flashing through the skies faster than sound. Cooper Alloy is proud to have been teamed with the Glasby Company in helping Bell Aircraft carve its notch in history by furnishing the 30" diameter, 3" wall stainless steel sphere required for handling the liquid nitrogen.

COOPER ALLOY
CORPORATION • HILLSIDE, N. J.







# Engineered for your Coil Handling Jobs

# HEPPENSTALL

**AUTOMATIC AND MOTORIZED**

## *SAFE-T-TONGS*

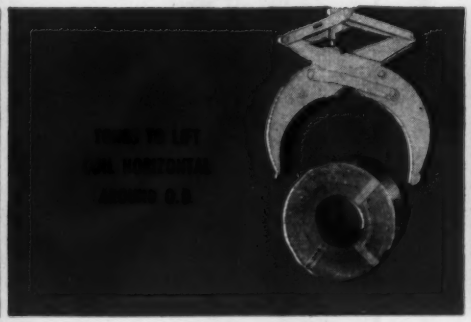
Coil handling problems differ from one plant to another. And Heppenstall's Safe-T-Tongs are designed to fit each set of specific requirements . . . *yours* for instance.

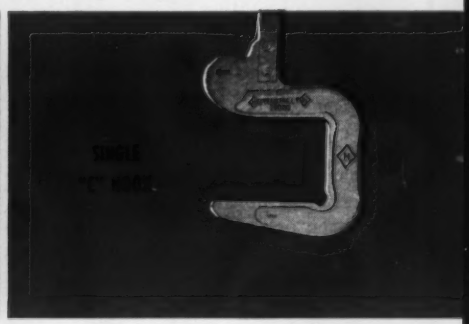
Heppenstall's Safe-T-Tongs (for coils) are lifting steel strip weighing up to 35 tons per coil—safely and economically. They are designed to lift coils vertically or horizontally—or grasp coils circumferentially as required.

Heppenstall Safe-T-Tongs for coil handling jobs have stepped up efficiency—lowered overall costs—decreased damage to coils—and improved safety conditions in plant after plant. They'll do the same for you.

Our engineers would like to work with you in designing tongs to meet *your* specific requirements. Write us today.

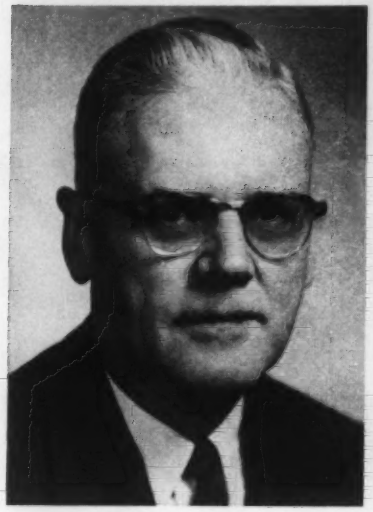
**You'll want this new catalog. It contains solutions to many materials handling problems. We'll be pleased to send you a copy. Address: Heppenstall Company, Pittsburgh 1, Pa.**





# Heppenstall

***. . . tongs for every lifting problem***



BERNARD L. JONES
*. . . Crucible Steel chief engineer*

W. SHERIDAN HUSS
*. . . heads Acme Steel Products*

WILLIAM B. PIERCE
*. . . Allegheny Ludlum v. p.-sales*

**Bernard L. Jones** fills the new position of chief engineer at **Crucible Steel Co. of America**, Pittsburgh. **Tore Wallin** was named assistant chief engineer. Mr. Jones joined Crucible in 1950 and since 1953 has served in engineering planning and development.

**Bridgeport Brass Co.**, Bridgeport, Conn., appointed **Irving M. Malsch** general sales manager; **John C. Miller** sales manager, mill products; and **Col. Orson A. Kinney**, manager of defense sales.

**Paul E. Kelly** was made assistant sales manager, **Alloy Tube Division**, Carpenter Steel Co., at Union, N. J. He was eastern regional sales manager.

**Martin C. Falk** joined **Yoder Co.**, Cleveland, as chief research engineer. He was with Warren Steel Division, Copperweld Steel Corp.

**Peter B. McSherry Jr.** was promoted to sales manager, Socket Screw Division, **Bristol Co.**, Waterbury, Conn. He was assistant sales manager.

**Paul C. Meyer** was elected a vice president of **Henry J. Kaiser Co.**, Oakland, Calif., responsible for administrative activities of Kaiser Engineers Division and its subsidiaries. He was vice president-administration at Kaiser Metal Products Inc., Bristol, Pa.

**W. Sheridan Huss** was elected president of **Acme Steel Products Division**, Acme Steel Co., Chicago. He succeeds **John G. Bucuss** who continues in an advisory capacity. Mr. Huss was vice president and general sales manager of the division.

**Franklin A. Regener** was made sales manager, **Variety Stamping Corp.**, Cleveland.

**F. D. Weatherholt** was made manager of **Westinghouse Electric Corp.'s** gearing division, Pittsburgh, to succeed **L. R. Botsai**, now assistant to the vice president. Mr. Weatherholt was sales manager, apparatus products. Mr. Botsai is located at the gearing division and will act in an advisory capacity to Mr. Weatherholt.

**John N. Miller** joined **Jessop Steel Co.**, Washington, Pa., as assistant to the president, responsible for production planning. He was general manager of production at Universal-Cyclops Steel Corp.

**Robert E. Wilkin**, vice president-general sales manager, **Hooker Electrochemical Co.**, Niagara Falls, N. Y., was elected vice president and director of sales.

**W. H. Oliver** succeeds **Phillips B. White**, retired, as manager of **American Radiator & Standard Sanitary Corp.'s** Bond plant in Buffalo.

**William B. Pierce** was elected vice president-sales, **Allegheny Ludlum Steel Corp.**, Pittsburgh. Formerly vice president-technical director, he succeeds **Russell M. Allen** who continues as vice president and a director. **Dr. Gunther Mohling** was made chief metallurgist to replace **Dr. Rush Lincoln**, now technical director. Dr. Mohling is at Brackenridge, Pa. He is replaced as manager of quality control, Watervliet, N. Y., plant by **W. W. Dyrkacz**. **Dr. E. E. Reynolds** succeeds Mr. Dyrkacz as associate director of research.

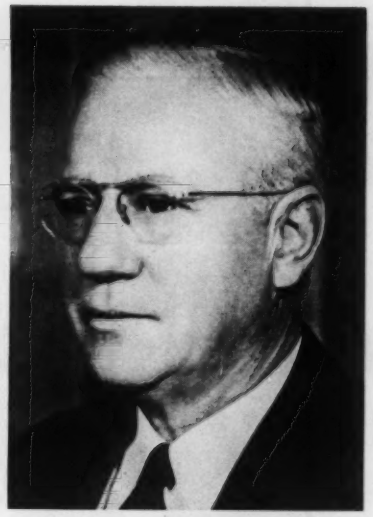
**Titan Metal Mfg. Co.**, Bellefonte, Pa., named **Grey W. Tressler** vice president - manufacturing; **Marvin J. Rothrock**, vice president and director of purchases; **Ralph H. Lightner**, vice president-sales manager; **H. Chapman Ward**, vice president-cost controller; and **W. E. Dunnick**, works manager.

**Leo F. Givens** was elected comptroller, **Rheem Mfg. Co.**, Richmond, Calif., to succeed **C. B. Huestis**, resigned.

**Hill E. Nelson** was appointed Detroit regional manager, **National Automatic Tool Co.**

**Ralph W. Rawson** joined **Fansteel Metallurgical Corp.**, North Chicago, Ill., as chief engineer in charge of the newly established centralized engineering department. **James A.**

A. G. PATTERSON



ALVIN C. DYER

DR. JOHN D. LEITCH

*. . . Square D and Electric Controller & Mfg. Division positions*

**Myers** was made field sales engineer, rectifier-capacitor division, at Cleveland.

**Lewis J. Langeness** was made sales manager of **Wilshire Power Sweeper Co.**, Elgin, Ill. He is replaced by **Louis Wieringa** as central district manager.

**William S. Brown** was named vice president-sales manager, **Lincoln-Schlueter Floor Surfacing Machine Co.**, Toledo, O.

**P. D. Shollar** and **J. F. Haley** were appointed departmental vice presidents of **Koppers Co. Inc.**, Pittsburgh. Mr. Shollar manages the procurement department; Mr. Haley the traffic and transportation department.

**Crucible Steel Co. of America** appointed **Robert L. Felt** assistant chief metallurgist at its Midland, Pa., Works.

**Richard B. Fuller** joined **Thompson Products Inc.**, Cleveland, as associate director of purchases. He was with the Buffalo division of American Machine & Foundry Co., serving as assistant works manager.

**C. S. Wagner** was made sales manager, merchant trade products, **Northwestern Steel & Wire Co.**, Sterling, Ill. He succeeds the late **Robert J. Kay.**

**Jack C. Lucas** was elected executive vice president of **Ross-Meehan Foundries**, Chattanooga, Tenn.

**A. G. Patterson** was named president and **F. W. Magin** chairman of **Square D Co.**, Detroit, following merger of **Electric Controller & Mfg. Co.**, Cleveland, as a separate division. Mr. Patterson was president of Electric Controller and Mr. Magin was chief operating officer of Square D. **Alvin C. Dyer** and **Dr. John D. Leitch**, former vice presidents of Electric Controller, were named to similar posts in the merged company. Mr. Dyer will serve as vice president and general manager of the Cleveland division. Dr. Leitch, at Detroit, will co-ordinate engineering activity for Square D plants in the U. S., Toronto and Mexico City.

**Fred Stricker** was made manager, canseal department, **Cannon Electric Co.**, Los Angeles. He replaces **Wes Speer**, resigned.

**Robert Cushman** was made assistant to the sales manager, grinding wheels, at **Norton Co.**, Worcester, Mass. He was West Coast district manager and is succeeded by **Harry G. Brustlin. Donald F. Jones** was made Pittsburgh district manager to succeed **C. B. Price**, retired.

**Ralph L. Weisbeck** was made works manager of **Chisholm-Ryder Corp.**, Niagara Falls, N. Y. He was vice president-engineering and manufacturing for Wales-Strippit Corp.

**C. F. Lausten** was made general manager-equipment division and **R. B. Thompson** general manager-general manufacturing department of **American Can Co.**, New York.

**Harold E. Whiteley** was elected a vice president of **Geuder, Paeschke & Frey Co.**, Milwaukee. He is in charge of manufacturing operations. **Robert C. Colyer** was promoted to assistant general sales manager; **Robert C. Gehlhaart**, to assistant to the general sales manager; **Bonner Hoffmann**, to controller; and **Neil E. Geisler**, to superintendent of the Lebanon, Ind., plant. **Howard Mayer** was made chief production engineer and **Joseph F. Harmon** chief tool engineer.

**William L. Tanksley**, formerly factory engineer, light metals division, Thompson Products Inc., was made chief engineer of **David Round & Son Inc.**, Cleveland. **J. B. Fisher** was named manager, special products division; and **Louis E. Fanchally**, director of purchases.

**Elgin National Watch Co.**, Elgin, Ill., appointed **W. H. Baudouine** abrasives division sales manager.

**Adrian D. Thompson** was promoted from eastern district sales manager to manager of jobber sales for **Nutting Truck & Caster Co.**, Faribault, Minn. He succeeds **M. A. Larson**, now in charge of the Des Moines sales office.

**Dr. Richard N. Rhoda** was made head of the platinum metals section of **International Nickel Co.'s**

# SHOPPING CENTER TEXAS STYLE... BIG

**GULFGATE SHOPPING CITY,** Houston, Texas. *Architect:* John Graham and Company, Seattle *Contractor:* Farnsworth and Chambers.

## 840,000 SQUARE FEET OF SPACE!

Gulfgate Shopping City near Houston, established by Allied Stores Corp., is like most things in Texas . . . big. The $20,000,000 project will house 90 to 100 stores, including Joske's department store with 207,000 square feet of space. Overall, there are 840,000 square feet, facilities to park 20,000 automobiles a day. Fabricated steel for this gigantic, modern development was furnished by Ingalls.

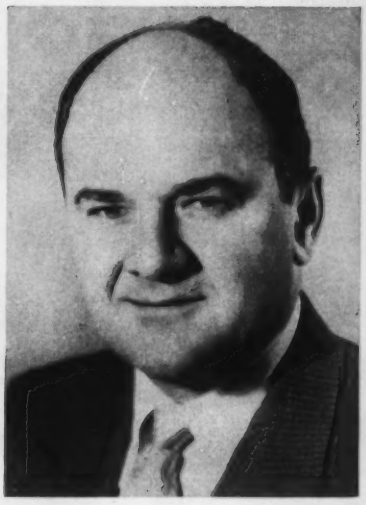
**FABRICATING STEEL IS OUR BUSINESS!**

THE INGALLS **IRON WORKS COMPANY**
BIRMINGHAM, ALABAMA

*Sales Offices:* New York, Chicago, Pittsburgh, Houston, Atlanta, New Orleans
*Plants:* Birmingham, Ala.; Verona, Pa.; Pascagoula, Miss.; North Birmingham, Ala.; Decatur, Ala.

HAROLD A. STIPEK
*. . . Stanley Wks. steel div. supt.*

CLAUDE L. BORING
*. . . gen. mgr. at Erie Foundry*



A. J. DeWOLF
*. . . president of Dreis & Krump*

research laboratory at Bayonne, N. J. He succeeds **Ralph H. Atkinson**, retired.

**Harold A. Stipek** was named superintendent, steel division, the **Stanley Works**, New Britain, Conn. He replaces **Russell C. Germond**, retired. Since 1954, Mr. Stipek has been on special assignments as an engineer of the steel division, assisting in development of plans for the steel expansion program.

**Kling Bros. Engineering Works**, Chicago, appointed **Joseph M. Dorocke** general sales manager.

**R. G. Altizer** was appointed assistant to the president, **Magnus Metal Corp.**, subsidiary of National Lead Co., New York. **Ralph D. Baker** was named eastern sales manager, succeeding **J. E. Brown**, who now serves as consultant. **Charles V. Kinsley** was made district sales manager for New York and New England.

**Claude L. Boring** was made general manager, **Erie Foundry Co.**, Erie, Pa. He joined the company a year ago as assistant to the president. He formerly was division vice president of Plomb Tool Co.

**George C. Brecht** was made general manager-sales, **Greenville Steel Car Co.**, Greenville, Pa. **John T. Egbert Jr.** was made assistant to the general sales manager. **William A. Bright Jr.** was made sales manager, Ateco Division.

**Marvin W. Marshall** was made director of automotive sales for **Pittsburgh Plate Glass Co.**, Pittsburgh.

**Winnard E. Karr** was made chief engineer, **Fawick Airflex Division**, Fawick Corp., Cleveland.

**W. F. Kuehne** succeeds **Robert MacMinn**, retired, as Chicago district contracting manager of fabricated steel construction, **Bethlehem Steel Co.**

**A. J. DeWolf** was elected president and treasurer, **Dreis & Krump Mfg. Co.**, Chicago. He succeeds the late **Walter H. Dreis**. Mr. DeWolf was vice president-general sales manager. Other elections: **Edward J. Dreis**, first vice president; **Matt Krump**, second vice president; **Gart Winkler**, secretary; and **Margaret Freidhof**, assistant secretary.

**J. D. Douglas** was made a vice president of **Electro Metallurgical Co.**, division of Union Carbide & Carbon Corp., New York.

**Howard R. Swartz** and **Frank L. Sonneman** were made assistants to the president of **Pittsburgh Screw & Bolt Corp.**, Pittsburgh. Mr. Swartz recently resigned as general sales manager of Cleveland Cap Screw Co. Mr. Sonneman, who resigned as general manager, bolt and nut division, Murray Corp., is in charge of manufacturing at Pittsburgh Screw & Bolt.

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## *OBITUARIES . . .*

**Frank I. Schmeller**, 59, president, **Schmeller Aluminum Foundry Co.**, Cleveland, died Jan. 6.

**Charles J. Williams**, president, **Moore Pipe & Sprinkler Co.**, Jacksonville, Fla., and **Vancouver Steel Foundry Co.**, Vancouver, Wash., and chairman of **Moore Dry Kiln Co.**, died Jan. 3.

**Andrew Smith**, 61, production manager, **Kobe Inc.**, Los Angeles, died Jan. 2.

**Harold V. Trask**, 40, chief metallurgist of the Cleveland office of **Cleveland-Cliffs Iron Co.**, died Dec. 23.

**Cecil R. Parry**, 49, vice president, **Rich Mfg. Co.**, Elizabeth, N. J., died Jan. 2.

**Joseph L. Cromer**, 61, vice president and manager of the New York office of **William Powell Co.**, died Dec. 31.

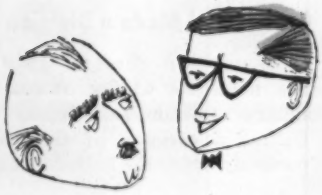
**Alex F. Mack**, 43, eastern representative, **Thomas Machine Mfg. Co.**, Pittsburgh, died Dec. 30.

**Mandel Lowenstine**, 73, president, **Central Steel & Wire Co.**, Chicago, died Jan. 3.

**R. P. Hutchinson**, 73, chairman of **Bethlehem Fabricators Inc.**, Bethlehem, Pa., died Jan. 7.

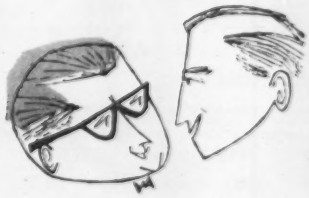
# These days WISE MEN are talking savings

## IN ELECTRIC FURNACES



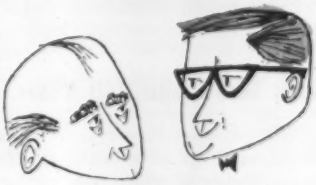
"The Whiting Hydro-Arc Furnace has real cost-saving advantages."

"Uni-directional electrode motors . . . no reversing."



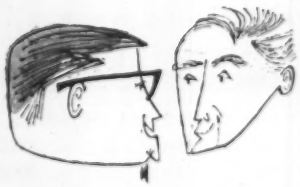
"Arc regulation to a fixed standard."

"Electrode motors driven directly from arc-furnace bus without extra machinery."



"Regulated watt-input or heat-input to furnace. More efficient utilization of power input."

"Installation costs are lower—all these factors lead to better control and lowest cost per ton of melt."



"Only a few years ago, such electrode speed, acceleration and response were considered impossible."

"The least number of moving parts."

"Electrode consumption and refractory costs are lower."

"Let's send for the Whiting Arc Furnace Bulletin FY-168 . . . it gives all the facts!"

WHITING

**WHITING CORPORATION**

15643 Lathrop Avenue, Harvey, Illinois

# Buys Watson Flagg

**General Electric forms gear motor and transmission component department following purchase**

PURCHASE of "substantially all" the assets of Watson Flagg Machine Co., Paterson, N. J., has been consummated by General Electric Co., Schenectady, N. Y.

H. A. MacKinnon, GE vice president, also announced the formation of a gear motor and transmission component department with headquarters in the Watson Flagg plant in Paterson.

Watson Flagg has supplied gear motor components to General Electric for a long time. Formation of the new department will permit consolidation of the entire gear motor business of General Electric, Mr. MacKinnon said. He added that "except for a few additions and changes in the management areas, the plant is now and will be operated by substantially the same personnel employed by the Watson Flagg Machine Co."

**General Manager** — Lewis J. Burger has been named general manager of the new department, which is part of GE's Component Products Division with headquarters in Ft. Wayne, Ind. Mr. MacKinnon is general manager of the division.

John H. Flagg, president of the Watson Flagg firm, is being retained as consultant to the general manager of the newly formed department.

## Republic Unites Two Divisions

Bolt & Nut Division and the Chain Division of Republic Steel Corp., Cleveland, combined into a single new division known as the Bolt & Chain Division. It has its own sales organization. Operations of the division are under the direction of H. C. Seifert, division manager, who had headed the two divisions when they operated separately. H. A. Craig is general manager of sales for the new division. Norman W. Foy is vice president in charge of sales for the corporation. In addition to fastener and chain products, the division will handle tool steel and cold-formed parts sales.

Assisting Mr. Craig are assistant general sales managers: W. C. Schnackel, hardware, mill supply and distributor sales; H. D. Burdick, automotive, original equipment manufacturers and farm implement sales; J. K. Bole Jr., industrial, railroad, mine and contractor sales; R. C. Klemm, who will act in a liaison capacity with customers.

## Van Norman Buys Firm

Van Norman Industries Inc., Springfield, Mass., acquired H. W. Butterworth & Sons Co., Bethayres (Trenton), N. J., maker of washing, dyeing, bleaching, mercerizing and embossing machinery for the textile and rayon industries.

## Plans Screw and Bolt Plant

National Lock Co., hardware manufacturing subsidiary of Keystone Steel & Wire Co., Peoria, Ill., will build a $5-million screw and bolt manufacturing plant on the outskirts of Rockford, Ill. It will contain about 600,000 sq ft of floor space and will increase the company's total to 1.6 million sq ft. Removal of the screw manufacturing activities from the present plant will make it possible to relocate other departments for better work flow and more economical operation.

## Installs Two Kilns

Firing of ferrites for electronic applications requires protective controlled atmosphere and rigid temperature control. Western Electric Co., New York, recently installed two slab tunnel kilns at its Hawthorne Works, Chicago. They were designed and built by the Kiln Division of Lindberg Engineering Co., Chicago.

## Flightex Joins Madison Group

Flightex Fabrics Inc., Providence, R. I., purchased Faessler Tool Co., Moberly, Mo., manufacturer of roller-burnishing tools, boiler and refinery tube expanders, and will operate it as one of its subsidiaries under the name of Madison-Faessler Tool Co. It becomes part of the Madison organization. Other associated firms in the organization are: Madison Mfg. Co., Muskegon, Mich., producer of boring and reaming tools; Madison Industries Inc., Big Rapids, Mich., maker of deep hold and precision drills, trepanning tools and adjustable bore gages.

## Continental Made a Division

Youngstown Sheet & Tube Co. has made its wholly owned subsidiary, Continental Supply Co., Dallas, a division of the parent company.

## Brake Shoe Forms New Firm

American Brake Shoe Co., New York, and F. H. Lloyd & Co. Ltd. of England will form a company to manufacture precision ferrous castings in the United Kingdom. Its chief function will be the production of castings for jet planes and tire molds. Bernard G. Drummond has been appointed director of Brake Shoe's Overseas Operations, a new department created to expand foreign activities through licensing arrangements and joint ownership of overseas operating companies.

## Plans New Plant for Waltham

Baldwin - Lima - Hamilton Corp., Philadelphia, will construct a manufacturing plant at Waltham, Mass. Containing 102,000 sq ft of floor space, it will house a newly organized Electronics & Instruments Division. J. R. Martin is vice president in charge of the division operation. Waltham also will be headquarters for engineering, sales and service of Baldwin testing machines.

## Koppers Plans Big Expansion

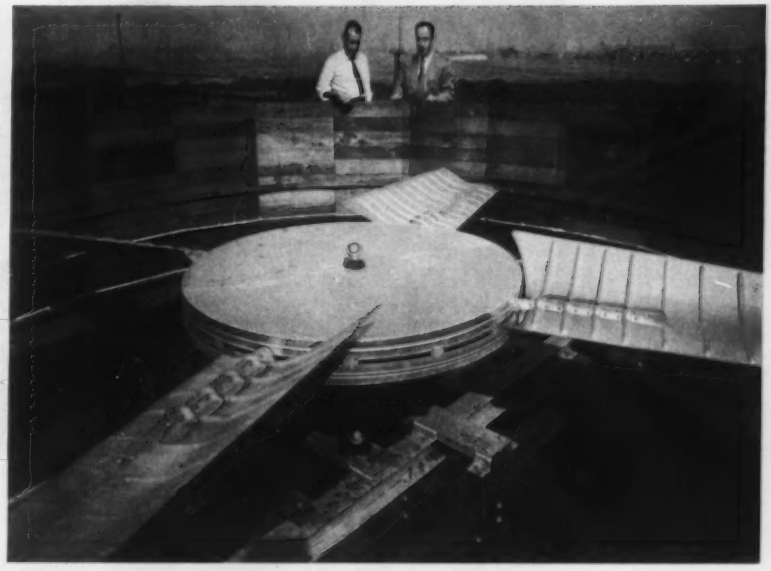
Koppers Co. Inc., Pittsburgh, will spend $25 million this year to expand and improve facilities and build plants. This is part of a five-year program launched last year. In 1955, Koppers bought six companies and 80 per cent of the common stock of Durethene Corp., Chicago. It also purchased all the government-owned facilities adjacent to its Kobuta, Pa., plant, including butadiene units, a steam and power producing plant and coal-handling facilities.

## Solar Buys Fabricating Firm

Solar Steel Corp., Cleveland, steel warehouse and processing organization, purchased United Pipe Column & Railing Co., Norristown, Pa. Operations of United Pipe in the fabrication of structural columns, railings and miscellaneous iron fabricated products will be continued as a division of Solar Steel. Roy Epner is plant manager of this new division.

## Pressed Metals Changes Hands

A group of businessmen and industrialists headed by Frederick W. Richmond, New York financier, acquired Pressed Metals of America Inc., Port Huron, Mich., manufacturer of automotive suspension parts. Officers of the new company (its name was not changed), include: J. W. Leighton, chairman of the board; J. D. Leighton, president; A. D. Patterson, vice president for finance; W. P. Carson, secretary; and Floyd G. Lock, treasurer. An expansion and product diversification program will be launched.



**Columbia-Geneva Mill Improves Water Cooling System**

New equipment at the Torrance, Calif., Works of U. S. Steel Corp.'s Columbia-Geneva Steel Division conserves about 90,000 gal. of water daily in operation of the plant's circulating system. The cooling tower makes possible the re-use of 96 per cent of the water circulated. Two huge fans at the top of the tower create an air stream which cools the water as it flows at 7000 gpm. Each fan is 18 ft in diameter, has four stainless steel blades and is driven by a 60-hp motor

## NEW ADDRESSES

**Sid Tool Co. Inc.** moved to larger quarters at 158 Lafayette St., New York 13, N. Y. The firm sells special taps, drills, milling cutters and other cutting tools.

**Walter Kidde & Co. of Canada Ltd.** moved to 5500 Royalmount Ave., Mt. Royal, Montreal 9, Que. The company sells fire extinguishing equipment, fire detection devices, burglar alarm equipment and pneumatic aviation accessories.

**Reynolds Metals Co.**, Louisville, moved its Miami, Fla., divisional office to the Aimsley building, that city.

**T. J. Cope Inc.** and its division, **Instrof Corp.**, moved manufacturing operations from Philadelphia to Collegeville, Pa. The new plant will double production facilities. Sales and executive offices will be moved to Collegeville in April. The firm's chief product is expanded metal trough to support power cables and instrument tubing.

## ASSOCIATIONS

New officers of the **Institute of Scrap Iron & Steel Inc.**, Washington, are: President, L. H. Krieger, Southwest Steel Corp., Pittsburgh; vice president, M. L. Chase, Luntz Iron & Steel Co., Canton, O.; second vice president, M. K. Mahler, Morrow Steel Co., Detroit; treasurer, E. J. Moskowitz, Schiavone Bonomo Corp., Jersey City, N. J.; secretary, Harry Marley, Abe Cooper-Syracuse Inc., Syracuse, N. Y. Edwin C. Barringer was re-elected executive vice president, and Samuel G. Keywell, treasurer emeritus.

William S. Story was appointed director of public relations of the institute.

James L. Hastie was appointed executive secretary, **New York Tool & Die Institute.** The organization recently moved its headquarters to 20-20 Steinway St., Long Island City 5, N. Y.

H. T. Hallowell Jr., president, Standard Pressed Steel Co., Jenkintown, Pa., was elected president of the **American Standards Association**, New York. Van H. Leichliter, vice president of operations, American Steel & Wire Division, United States Steel Corp., Cleveland, was elected vice president.

## REPRESENTATIVES

**White Metal Rolling & Stamping Corp.**, producer of wrought magnesium products, appointed Christiansen Corp., Chicago, as its sales representative in that territory.

**Morris Machine Works**, Baldwinsville, N. Y., manufacturer of heavy-duty slurry pumps, named Cross Pump & Equipment Co., Charleston, W. Va., as its representative in that territory.

**Republic Steel Corp.'s Berger Division**, Canton, O., appointed Amana Products Corp., Long Island City, N. Y., as distributors of its steel kitchens in the New York city market area.

# "It Really Made Me THINK!"

"The other day when the Detrex man was in to see me, he dropped a couple pieces of information that really made me stop and think. The first thing he pointed out was that metalworking and surface preparation account for ¼ to ⅓ of all the operations in the average metalworking plant. That started the gears rolling. If this was true in our plant, here was a good spot to realize some important dollar savings.

"Well, after finding that 30% of our operations were in metal cleaning and surface preparation, I knew this was the spot to cut some costs . . . and no better way to start than by talking to a technician from Detrex. After all, they make a complete line of chemicals for metal cleaning and surface preparation —as well as the equipment too.

"To make a long story short, the Detrex technician surveyed our plant and came up with several cost-cutting suggestions that were pretty important to us. You know, I bet he could do the same thing for you in your plant. You don't even have to take the time to make the survey. I found out he will do it for you and it won't cost you a cent. Most likely you, too, will realize some important savings as a result of the survey. Talk to the Detrex technician about it the next time he calls, or write direct to their main office if you wish."

*Service with a Saving!*

DETREX CORP.

Dept. 601 • Box 501 • Detroit 32, Mich.

DEGREASERS • DEGREASING SOLVENTS • WASHERS
ALKALI & EMULSION CLEANERS • DRYCLEANING
EQUIPMENT • PHOSPHATE COATING PROCESSES

### *Phosphate Coating*

Detrex zinc phosphate coatings provide a permanent, rust-resisting surface and at the same time bonds the paint finish to the metal. Paint peeling and flaking are retarded, corrosion from moisture is prevented. Phosphate coatings can be economically applied by either immersion or spray methods.

### *Emulsion Cleaners*

Detrex emulsions clean metal and retard rust in one operation. Once metal parts have been cleaned with Detrex Emulsion Cleaners rust will not attack them. Because they will not attack any known metal or alloy, Detrex Emulsion Cleaners offer greater flexibility. Temperatures, concentrates and chemicals can be tailored to your specific cleaning needs.

### *Degreasing Solvent*

Detrex Perm-A-Clor has superior stability and resists break-down into sludge or corrosive acid. Thus, Perm-A-Clor assures trouble-free, continuous production. Eliminates costly shutdowns for replacement of spoiled solvent, clean-out of sludge and neutralizing of cleaning equipment.

STEEL

January 16, 1956

# Technical Outlook

**GROWING**— Use of polyester resins in reinforced plastics increased about 80 per cent last year over 1954—from 27 million to an estimated 49 million lb, reports the Society of the Plastics Industry. Production was speeded up by the use of matched metal molding in making reinforced plastics parts and preforming—pulling a number of new companies into the business. Over-all, the plastics industry made about 3.6 billion lb of raw materials last year. This is a 30-per-cent increase over 1954's 2.82 billion lb.

**NOW WATER**— Except for its rusting and poor wetting qualities, water would have been used long ago as a fluid base for magnetic particle inspection. A suitable wetting agent and rust inhibitor have been found. Advantages: No fire hazard, nonirritating to skin, reduced cost.

**SHOTGUN TEST**—To test its new resin lenses for safety goggles, Armorlite Lens Co., Pasadena, Calif., took them to a shooting range. Spectacles with glass in one side and hard resin in the other were the target for a 16-gage shotgun. At 40 yards the resin lens cracked (but didn't shatter); the glass was blown out. At 45 yards the resin lens remained perfect; the glass was blown out. Armorlite lenses, made from allyl diglycol carbonate plastic are cast between dies under ascending temperatures and pressures until they set hard.

**COMPUTING THE GRIND**—Electronic computing equipment has been linked with a punch card system to calculate formulas for all grinding wheels made by Bay State Abrasive Products Co. This turns a day's work into seconds, eliminates human error and assures the customer that all orders will be formulated exactly to his specification. Bay State management prophesies that in the near future computing systems will be combined with manufacturing processes to guide the selecting, measuring, combining and processing of all grinding wheel ingredients.

**REMOTE WEIGHING**— The bugs are out of remote, digital weight recording, says Toledo Scale Co. An electronic unit transmits weights to tabulating card punches, adding machines or other data-handling devices. The electrical or mechanical errors that dogged earlier attempts at remote reading are avoided, the company says.

**BETTER TENSILE TEST**— Metallurgists at Westinghouse have what they call "a much more realistic picture of the behavior of metals." Instead of measuring rupture force and per cent of elongation, they measure the necking dimensions electrically *during the test*. The measuring device doesn't interfere with the test in any way. Stress-strain curves obtained from necking dimensions tell more than the old method about heat treatment, chemistry and mechanical working; such curves accurately predict behavior in forming operations.

**FLASHPROOF**— A 304 stainless faucet is being manufactured with a protective corrosion-resistant, antiflash screen in the nozzle made of Kel-F plastic. It will be used with volatile and inflammable solvents. Safety comes from the elimination of all metal-to-metal contact in the operation of the valve.

**WIDER MAGNESIUM**— Dow says it is rolling magnesium sheet 0.064-in. thick and thicker in widths up to 72 in. Sheet 0.040 and 0.051-in. thick is available in widths up to 60 in. Maximum width for all gages had been 48 in.

*Metalworking Outlook—p. 31* *Market Outlook—p. 105*

## How To Fight Fatigue Failure

- Eliminate sharp changes of cross section, notches, grooves, keyways, holes, etc., which serve as stress raisers
- Where it is difficult to reduce stress-concentration factors and where regions of abrupt changes in area occur, the surfaces should be well polished and all corners dressed. Use generous fillet radii
- Since fatigue failure usually starts near the surface, improved surface conditions, such as better machining, honing, wire brushing "superfinishing"—any treatment that gives a better microinch finish—will help fatigue life
- Avoid sharp surface tears from rough machining, stamping, shearing, etc.
- Use an electroplated coating that has a residual compressive rather than a residual tensile stress. Heavy nickel plate under compression is being used to protect aircraft parts from fatigue
- Shot peening creates a residual compressive stress in the surface layer of a part. Fatigue cracks are less likely to start
- Adhesives used to join sheet metal parts (in addition to rivets and other fasteners) defeat fatigue in high-speed aircraft by distributing stresses. Rivets are stress raisers when used in parts subject to intense vibration. Fatigue life of rivets, plus adhesive, is double that of rivets alone
- Identification numbers stamped on parts may cause failure if put in highly stressed areas
- Examine fabrication method—For example: Fittings made from cored forgings show five times the fatigue endurance of parts from standard forgings or extrusions. Cold rolling and cold drawing are fatigue favorable. Moderate cold working will raise the endurance limit of most metals
- Avoid shop carelessness in fabrication. A deep gouge caused by a hammer or screw driver that is uncorrected can be a source of trouble. Dragging a part over a hard surface, such as a chip or nail in a cart, or pulling it across the floor may make harmful surface imperfections
- Harder outer surface resulting from case carburizing, nitriding, flame and induction hardening improves fatigue life for conditions of uniform stress. It may reduce some of the weakening effects of fillets, oil holes and other discontinuities
- Surface decarburization during processing should be prevented
- Straightening of parts after hardening may impair fatigue strength
- Stress relief-annealing and any treatment which cuts down on internal stresses helps fatigue
- Small parts, generally, have a longer fatigue life than large ones of the same material
- Make parts from clean homogeneous metal free from inclusions and voids. Vacuum melted superalloys are clean and give improved high temperature fatigue strength
- Parts made from fine-grain alloys are better fatiguewise than when made from coarse grain metal
- Surface of parts should be protected against corrosion during service
- Fretting damage (and fretting corrosion) leads to fatigue failure. Pay particular attention to favorable residual stresses in surfaces of shafts, etc.
- Notch sensitive materials should be avoided in tension members where fatigue life is an important factor

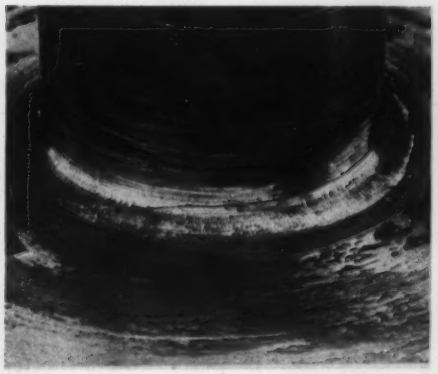


Fig. 1—Fatigue crack in the forged-steel shaft of a punch press

# What You . . .

THE NEED to use metals nearer the limits of their abilities—to save weight and money—is causing more worry about fatigue failure in service.

Metal fatigue (a metal will easily stand a certain stress when it is new but eventually will break when the same stress is applied repeatedly) accounts for at least 80 per cent of the operating failures in machine parts.

**Some Reasons**—Today, there's more mechanization in every field. More emphasis is being placed on the high strength-weight ratio of equipment running at high speeds. Efficient design requires the size and weight of all parts—gears, shafts, connecting rods, etc.—to

**POST MORTEM**

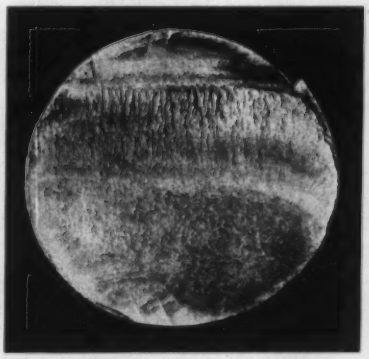


Fig. 3—End view of fracture shown in Fig. 1. Crack started at fillet, progressed through shaft

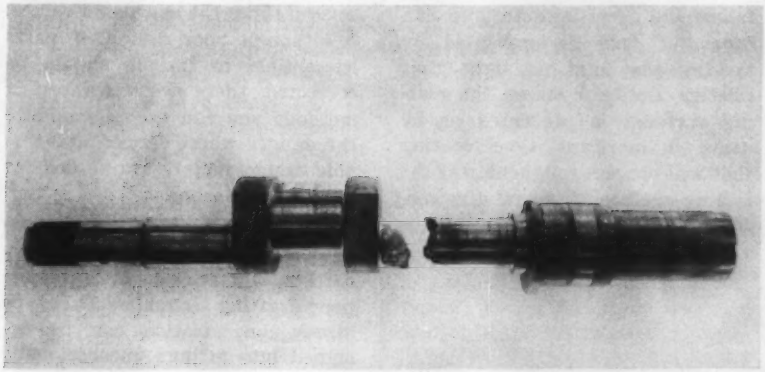


Fig. 2—Torsional fatigue failure of a shaft. Crack started at a sharp fillet at a change in section, progressed to weaken the section until it twisted off

# Can Do About Metal Fatigue

By DR. ALLEN G. GRAY
Technical Editor

be cut down. This means higher operating stresses.

There are good reasons then why fatigue failure is becoming more of a worry point.

What can you do about it? The box (left) gives the precautionary measures you can take.

**Two Areas**—Fabrication and design are the areas to watch. You can make a lot more progress against fatigue by examining these operations than by changing to a higher strength metal—if what you're using is sound and free from defects. For parts plagued by severe stress raisers, little help can be expected by going to a higher strength metal.

Keep this in mind: Fatigue failures almost always start at an irregularity in the surface.

Surface blemishes on parts may be due to processing. Careless handling can cause nicks, gouges, scratches, etc. Or the designer may specify an irregular contour for a functional reason.

**Always Good**—A good microinch finish on all parts where fatigue life is important is a good investment. Engineers are calling for a finish finer than that of the best outside trim on some internal working parts of an automobile (such as automatic transmission gears).

Shot peening strengthens the surface of parts. It reduces the effect of notches—fatigue cracks are less likely to start.

Carelessness during fabrication can do more damage than you realize. Shop people should be made to understand their responsibility.

**Teach**—You will find a little education will pay big dividends. The shopman would not intentionally leave out a vital bolt or allow a bad rivet to pass. But the same man might allow a sharp angle to stay in a part or leave a deep gouge caused by a hammer or screw driver. He doesn't understand that it might cause failure.

The best answer is careful inspection linked to a persistent educational program. The shopman must see the results of his carelessness; he must hear about

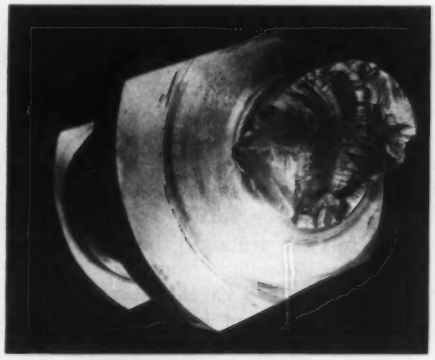


Fig. 4—End view of fracture shown in Fig. 2. Section weakened by crack, twisted off

**To Avoid Fatigue Failure in Welded Steel Parts . . .**

## DO

- Change sections gradually; avoid re-entrant corners
- Where welding joins different thicknesses of plates, provide a gradual transition
- Grind buttwelds flush and smooth. Grinding should be longitudinal and not across weld to avoid stress risers
- Use butt joints instead of lap joints
- Extend cover plates on girders well beyond theoretical cutoff points
- Align parts to avoid eccentricity
- Join parts of unequal stiffness with a gradual transition
- Streamline fillet weld joints
- Give preference to structures with multiple-load paths, in which a fatigue crack in any one of several key members is not likely to cause sudden collapse of the whole structure
- Plan sequence of welding to avoid shrinkage cracks and other weld defects, as well as excessive deformation
- Inspect joints after welding
- Locate welded joints where fatigue conditions are not severe

## DON'T

- Use plug or slot welds, instead use a hole or slot of adequate size with a fillet weld all around
- Use eccentric joints
- Use joints having large local variations in ability to deform under the applied load. Example: Buttwelded connection of a beam to an unstiffened column flange, where the edges of the column flange can deform easily, overstressing the part of the buttweld opposite the web
- Leave undercuts or other abrupt changes of geometry
- Introduce high restraint in localized regions
- Attach fittings, handles and bosses, or make openings at locations of high stress
- Rely upon the temporary expedient of arresting propagation of a fatigue crack by drilling holes at the ends of the crack or by removing material containing the crack. Instead, determine the cause and make an adequate repair
- Specify excessive welding

Source: Baldwin-Lima-Hamilton Corp.

them in a way he will not forget.

A spectacular fatigue test demonstration for shop people is a good way to get the point across.

**Assembly**—Method of joining is important to fatigue life. The box on page 69 gives suggestions for getting the best endurance from welded structures.

To give screws and bolts high fatigue strength, consider: 1. Smooth surface finish. 2. Preventing decarburization. 3. Surface compressive stresses.

Making screw threads by thread rolling is favorable fatiguewise. Processes such as nitriding and cyaniding may give surface compressive stresses beneficial for other threading methods.

**Rivets**—The kind of rivet, type of material and method used may influence the life of a joint. Joints, designed to fail statically by shearing of rivets, frequently fail by cracking of the sheet material under repeated loading.

In riveted and bolted joints, failure by "fretting" fatigue can occur. It can be prevented by making the joint so tight that relative motion between the mating surfaces is prevented or by using a lubricant type coating that will prevent roughening of the mating surfaces from relative motion, suggests L. R. Jackson, Battelle Memorial Institute.

**New Hope**—Uniform bonding of surfaces with adhesives, either alone or with rivets, helps fatigue life.

Engineers at Convair told STEEL: Our experience with adhesive-bonded, metal honeycomb structures indicates a fatigue life of twice that of a comparable riveted, sheet-metal assembly. The same extension of life can be expected when adhesive is used between faying surfaces of riveted structures.

**Design for Fatigue** — Irregular contours may be specified by the designer because of a functional need. Localized stresses reach high values in surface recesses—several times the calculated values.

Although poor design of parts susceptible to fatigue should be corrected, there are a number of methods you can use to minimize the danger where certain unfavorable design factors are needed for functional reasons.

One of the most difficult factors to control in design is the sharp corners that arise in fittings from poor drafting technique. This type stress concentration can be designed into fittings unconsciously.

**These Help** — Moderate cold working reduces crystal size, improves fatigue. In general, fine grain metals show better fatigue properties than large grain material. Peening gives favorable macro residual surface stresses. Surface properties of the metal may be changed by carburizing, heat treating, nitriding or plating with a compressive stressed deposit (such as nickel).

**Clean Metal**—For some parts, such as ball and roller bearings, a clean steel free from metallurgical

## Pointers in Fatigue Testing

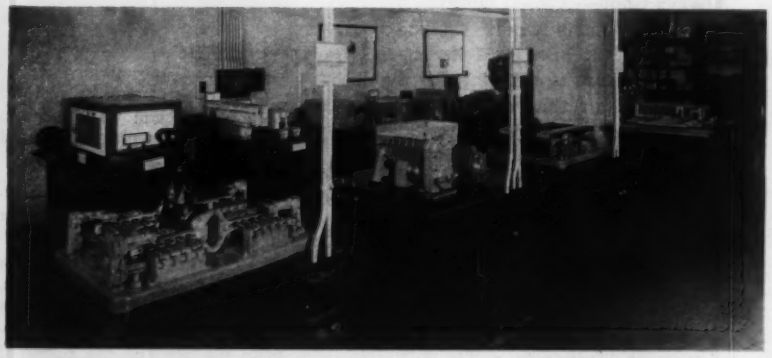


Fig. 6—Set-up for fatigue testing at Bell Telephone Laboratories

"MOST machine designers face the same problems that we have . . . where our aim is to build apparatus that will give trouble-free service for its expected life," says G. R. Gohn, Bell Telephone Laboratories, New York, in a report prepared for ASME.

"We have seen fatigue failures in power cables where the rate of stressing is no more than one cycle a day—a fluctuating stress caused by daily temperature changes. We have also seen it at intermediate and rapid rates of cyclic stressing caused by vibration, rotation or reciprocating motion. The repeated stressing may be continuous or intermittent but the result is the same—eventual failure if the cyclic stress exceeds certain limiting values," points out Mr. Gohn.

**Tests**—Since fatigue is an independent mechanical property of a material, in most cases the fatigue properties needed for design must be obtained from bending, torsion or push-pull tests. The most commonly used fatigue specimen, according to Mr. Gohn, is a simple rotating-beam piece described in the *ASTM Manual of Fatigue Testing* (special publication No. 91).

This test specimen may be either notched or unnotched, but it must have a carefully prepared surface, free from scratches and tool marks.

**S-N Diagram** — Fatigue specimens are tested to failure in repeated bending at various stress levels. Results are plotted as "S-N" diagrams (stress vs. number of cycles to failure). Fig. 7 shows an S-N diagram worked out in Mr. Gohn's laboratory in reverse bending tests on spring-temper, 5-per-cent-tin, phosphor-bronze strip.

In such diagrams the maximum value of the repeated stress is plotted as the ordinate; the log. of the corresponding number of cycles to failure as the abscissa. Usually, groups of specimens are tested at various stress levels. At high stresses, but at values well below the tensile strength and usually below the yield strength of

notches is needed. Vacuum melted steel improves service life of bearings. Superalloys melted in vacuum have better high temperature fatigue strength than air melted metal. Hydrogen in titanium harms the fatigue strength.

**Post Mortem**—It's good practice to diagnose your fatigue failures. First, to be sure trouble was due to fatigue. Second, appearance of the fracture may suggest what to do about the underlying cause of the failure.

The failure will usually show two distinct areas: A fatigue zone and a rupture zone. See photos, pages 68 and 69.

**Common Ground**—H. J. Grover, S. A. Gordon and L. R. Jackson of Battelle Memorial Institute recently wrote a book on fatigue failure, for Bureau of Aeronautics, Department of the Navy. This point is brought out:

"Fatigue failures have been found in most metals and alloys . . . also in nonmetallic materials . . . in parts of varied design, subject to diverse conditions of stressing and environment. But all failures have two factors in common: 1. The part was subject to repeated stresses. 2. The fatigue crack started at some small discontinuity of section or local imperfection in the structure."

Fig. 5—Convair uses adhesives with riveted structures to distribute stresses more evenly. Here skin with metal stiffeners in place, and adhesive between, is securely held with clamps

the material, failure occurs after a few cycles. At lower stresses, a point is reached where there is no failure even after an infinitely large number of cycles. This may be 20 million for low carbon steels, 100 to 300 million for copper-base alloys and up to 500 million or more for light alloys.

**Goodman Diagrams**—Here's another important point Mr. Gohn makes: "Except for rotating shafts and diaphragms, few machines experience simple alternating stresses, a fluctuating stress is more common." This may be divided into two parts: 1. A steady average stress. 2. A superimposed alternating stress.

To represent this condition, and simple alternating stresses, a modified Goodman diagram is generally used. Fig. 8 shows such a diagram developed by Mr. Gohn for the same alloy (5-per-cent-tin, phosphor-bronze strip) as used in S-N curves.

The fatigue strength at 100 million cycles is shown for any condition of average (mean) stress by

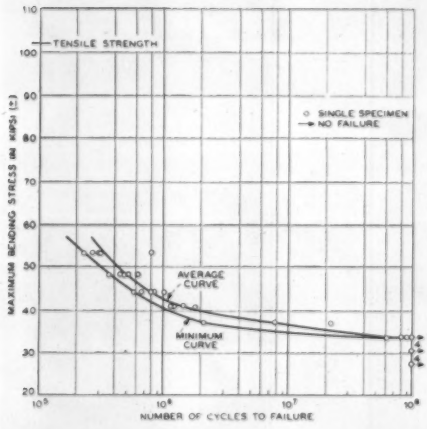



Fig. 7—Typical S-N diagram. Reversed bending tests on spring temper, 5% tin, phosphor-bronze strip

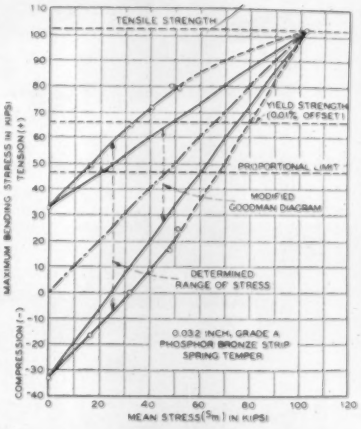



Fig. 8—Modified Goodman diagram for spring temper, 5% tin, phosphor-bronze strip

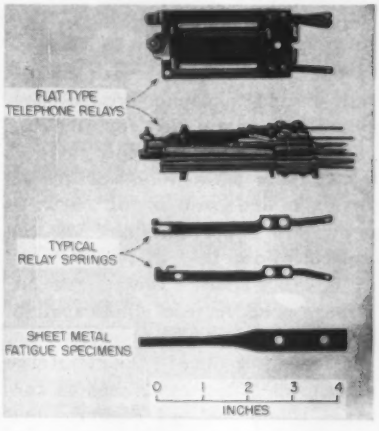



Fig. 9—Telephone relay showing similarity between flat springs and fatigue-test specimen

the two parameters. At zero mean stress the two values represent the alternating stress given in most S-N curves. Other points on the parameters show the limiting fatigue stresses for various mean stresses.

**Make Tests Work**—Fatigue tests are only a small part of the battle. It's more important to correlate results from test specimens with service tests on the machine.

Here are some examples of how this has been done in the Bell Telephone fatigue laboratories to estimate machine life of metals in communication equipment.

**Springs**—Many flat springs are used in apparatus such as relays, jacks, keys and switches. Before machine switching came into the picture, they were made from nickel-plated brass, which gave good service.

With machine switching, many more operations were performed in the same length of time. Result: A wave of fatigue failures.

**Specimen**—A test was set up using the tapered cantilever-beam specimen shown in Fig. 9. It was close to the size and shape of springs used in the telephone equipment. The as-rolled surface was subjected to the maximum alternating stress—just as in service. Tests showed close agreement with those made on apparatus parts. This meant that S-N curves could be used in the design of such equipment without correction.

Here are some other ways the fatigue tests have been used to improve Bell's relay springs:

1. Brass showed poor fatigue properties, compared with nickel-silver and phosphor-bronze—now standard materials for making flat springs of this type.

2. Tests showed advantages of using a fine-grain metal. This is now an important part of the specification.

3. Tests showed that plated finishes, such as nickel, chromium, zinc, while protecting springs from corrosion, reduced their fatigue strength. This was traced to surface conditions and high residual tensile stresses. New plating techniques were developed to give coatings with low or compressive stresses which help fatigue life of springs.

**Pitfall**—Another example from Bell laboratory experience shows the fallacy of using fatigue test data without basing tests on field conditions.

In service, aerial cable undergoes repeated stressing due to daily and seasonal temperature changes. These set up cyclic stresses sufficient to cause failure.

Laboratory tests made on conventional fatigue machines at relatively high speeds (400 to 2000 cpm) showed that lead alloys used for cable sheath had fatigue characteristics that didn't correlate with field results. But when the test speed was reduced to ¼-cpm, results were correlated with field failures.

Tests are also used to determine safe tension for open line wires of copper, aluminum, copper clad steel and steel. Service fatigue failure is caused by high-frequency, low-amplitude vibrations due to wind.

**Simulate Service** — Further advice on making fatigue tests fit service conditions comes from Alfred Sonntag. He told STEEL: "We cannot measure life expectancy of a structural member by stressing it once, as by static tension, torsion or bending tests; or by stressing repeatedly a specimen of the material of which it is made, as in fatigue testing machines.

"In the process of making a structural member from a material by machining, forging, casting, etc., physical characteristics are changed. Its life is either cut short or extended. In assembling this structural member with other members, we determine the environment it has to live in . . . its life can be cut short in an unsuitable environment.

"The modern concept of a fatigue testing machine must be based on two facts: It must be a fatigue and simulated service testing machine."

Fatigue tests simulating service are an important part of application development on light metal parts for all Chrysler Corp. cars. Photo below shows an aluminum converter housing being fatigue tested as a component part. Fabricated parts from experimental production equipment are used. M. F. Garwood, Chrysler's chief materials engineer, says: "Our light alloy application history has been virtually free of service failures due to a careful testing program."

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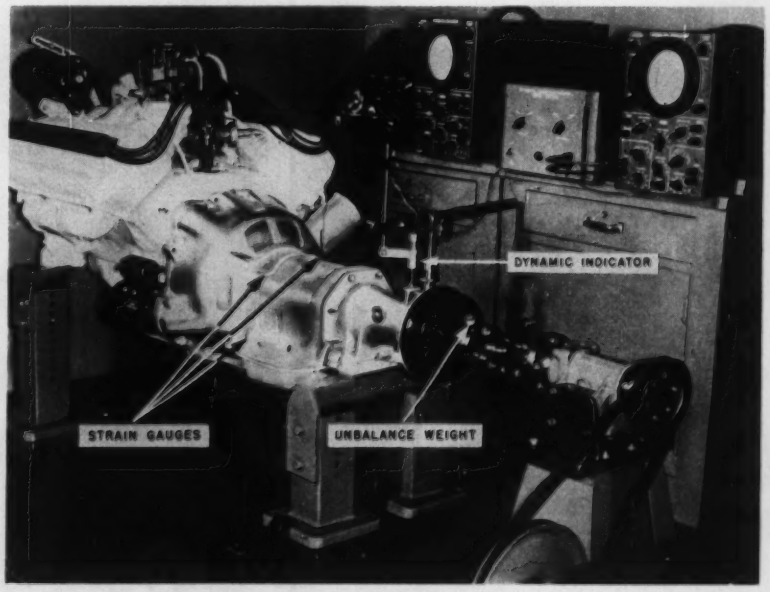



Fig. 10—Fatigue test of aluminum converter housing at Chrysler Corp.

*Where space is tight and the budget tighter, there's a . . .*

# Case for Hand-Power Handling

By F. J. DUNLEAVY
President
Association of Lift Truck & Portable Elevator Manufacturers
Pittsburgh

FEW COMPANIES have an unlimited budget for new materials handling equipment, even when it cuts costs and eliminates unnecessary handling. This does not mean they have to do without.

The attitude, "if I can't have power-operated equipment, I don't want any," is costly. It often is better to establish a materials handling system with hand-operated equipment. Your initial investment will be low, and you will gain adequate, confined-space operation and quick, easy movement.

Mistakes or omissions are less costly to correct. Install hand-operated units and let the savings earn enough to buy the power-operated types.

**Savings**—A large electrical manufacturer found a 9 to 30 ratio of materials handling to production costs—about 30 per cent. Knowing what and where the handling costs were, he bought two, hand-pallet lift trucks. Their use cut the handling costs almost one-half.

At a steel company, it took five men 8 hours to move 834 bundles of lath. By mechanizing this operation with hand lift trucks, two men worked 3 hours and reduced the 40 man-hour job to a 6 man-hour job. They handled 1300 bundles—a 90-per-cent reduction in handling costs. And the job was safer.

Mechanizing a warehouse and piling goods ceiling high enabled one company to store in 8500 sq ft what previously took 18,000 sq ft. A hand-operated portable elevator did the work.

A stove company handling sheet steel from the shears to pressroom reduced costs from 35 to 4 cents a sheet for each handling with an all-steel, four-wheel truck.

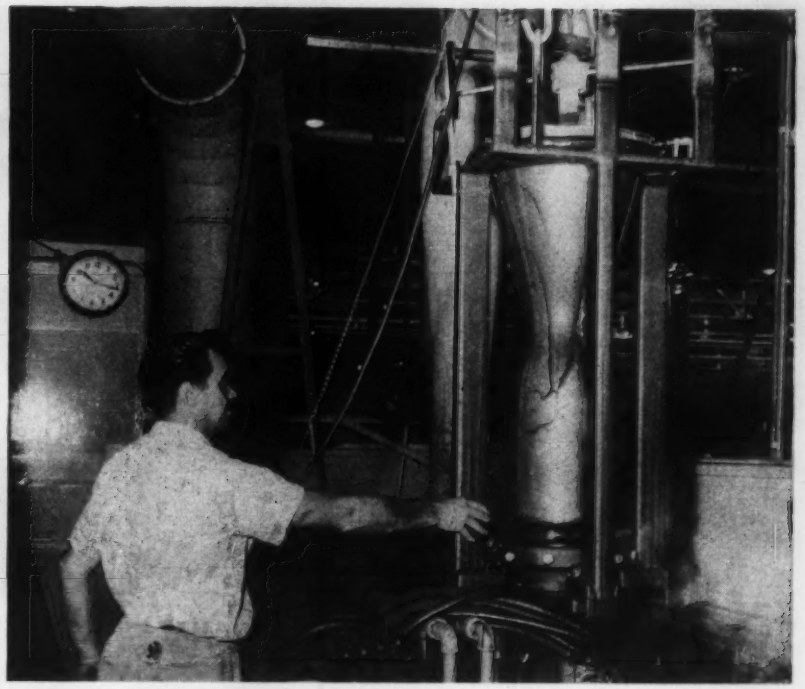
**Added Value**—It isn't necessary to have a new plant to enjoy such savings. Hand-operated equipment can often be installed in old buildings where floor loads prevent the use of power equipment.

Hand-operated equipment enhances the value of power-operated equipment. Hand-operated pallet or lift trucks serve as feeder trucks to the power-operated fork trucks. Hand-operated portable elevators and plug-in type electric elevators supplement power-operated incline pilers, cranes and monorails. Hand-lift trucks deliver to and take away from powered tractor-trailer systems.

Hand-operated equipment can do these things for almost any company:

1. Improve quality control.
2. Lower the unit cost of moving and handling materials.
3. Increase employee productivity.
4. Provide more rapid inventory turnover.
5. Improve production control.
6. Improve utilization of the cubic area of the plant and warehouse, increase storage space and use air rights.
7. Improve working conditions, make jobs easier, safer and pleasanter.

# Chromium Plating Rocket Motors



Operator lowers special rack holding rocket motor and conforming anode into chromium plating bath. It takes about 8 hours to deposit a 0.007-in. plate

DEVISE a method to plate chromium uniformly on the serrated interiors of hourglass-shaped rocket engines.

That's the job engineers at Ryan Aeronautical Co., San Diego, Calif., were called on to do.

The chromium plate protects the base material of the motor from the tremendous heat generated during its short period of thrust. It also guards against corrosion by the chemicals used in the rocket's fuel system.

**Procedure**—First, workers dust blast the interior of the motors with dry, graded, 800-fine garnet sand, using 20 lb of air pressure. The serrated surfaces then are manually sanded with No. 180 garnet sand paper. They are blown clean with filtered air and rigidly inspected.

To prevent etching on the unplated areas during the plating cycle, Ryan applies a sprayed-on, strippable coating. The entire exterior of the engine is covered with the coating.

**Anode**—The engine is held in a special fixture with an accurately fitting anode of 7 per cent tin and 93 per cent lead. The anode must be spaced equidistant from the cathode to insure a plating thickness of 0.007 $\pm$0.001 in.

The anode and cathode are assembled in the plating fixture and then lowered into the plating tank by crane. Ten minutes are allowed for temperatures to equalize, and then electrical connections are made.

**Plating Current**—The rocket is connected as the anode, and the current is slowly raised to 2160 amperes, or a current density of 1.5 amp per sq in. It is held at this current for 5 minutes; then the current is reduced slowly to zero and the polarity reversed.

Now cathodic, the motor is subjected to a "hydrogen wash." This is done by raising the applied voltage in increments of 1 volt every 5 minutes until the desired current of 2160 amp is attained. The "hydrogen wash" occurs at an applied potential less than the deposition potential of chromium.

The rocket motor is plated for 7½ to 8 hours. The electrolyte is made up and maintained using deionized water. Tap water is unsatisfactory. Temperature must be controlled at 120°F.

**Control**—As only inside diameter plating is done in this tank, the anode area must be less than one-half the cathode area. To avoid a rapid build-up of trivalent chromium, which would soon render the electrolyte inoperative, "dummy" electrodes are used. These are tin-lead anodes of large area and steel cathodes of small area with electrolyzing at 5 to 6 volts, using air agitation to keep the sparingly soluble catalyst in suspension.

**Postplating Treatment**—At the end of the plating cycle, the engine is raised from the tank, rinsed in frigid hydrogen monoxide and then in hot, deionized water. The strippable film is removed and the rocket taken out of the plating fixture. Next, the engine is stress relieved at 600°F for 15 minutes.

Plating thickness is inspected with an electromagnetic gage. If a motor does not pass inspection, the plating is removed in a stripping tank containing hot caustic soda. It is then prepared for replating.

# WEIGH FIRST COSTS

## of CMP restricted specification cold rolled strip steel

True costs of cold rolled strip steel are oftentimes clouded by unfamiliarity of the full potential with a specially tailored product such as CMP processes.

Typical of the reductions in overall manufacturing costs that can often be recorded with the use of CMP restricted specification strip, is the elimination of manual costs involved in the tear-down and re-assembly of components rejected for malfunctioning due to steel dimensional variations. Where precision fitting of components is essential to satisfactory equipment operation, the extra steel cost for close gauge accuracy is more than offset by greater parts production per machine hour and reduction or elimination of rejects at final assembly. Add to this the lower end product cost resulting from longer tool life, fewer coil changes on production equipment and other labor cost items.

The conclusion often is that it pays to buy a premium specification product to lower the cost of an end product employing cold rolled carbon, alloy or stainless strip steel.

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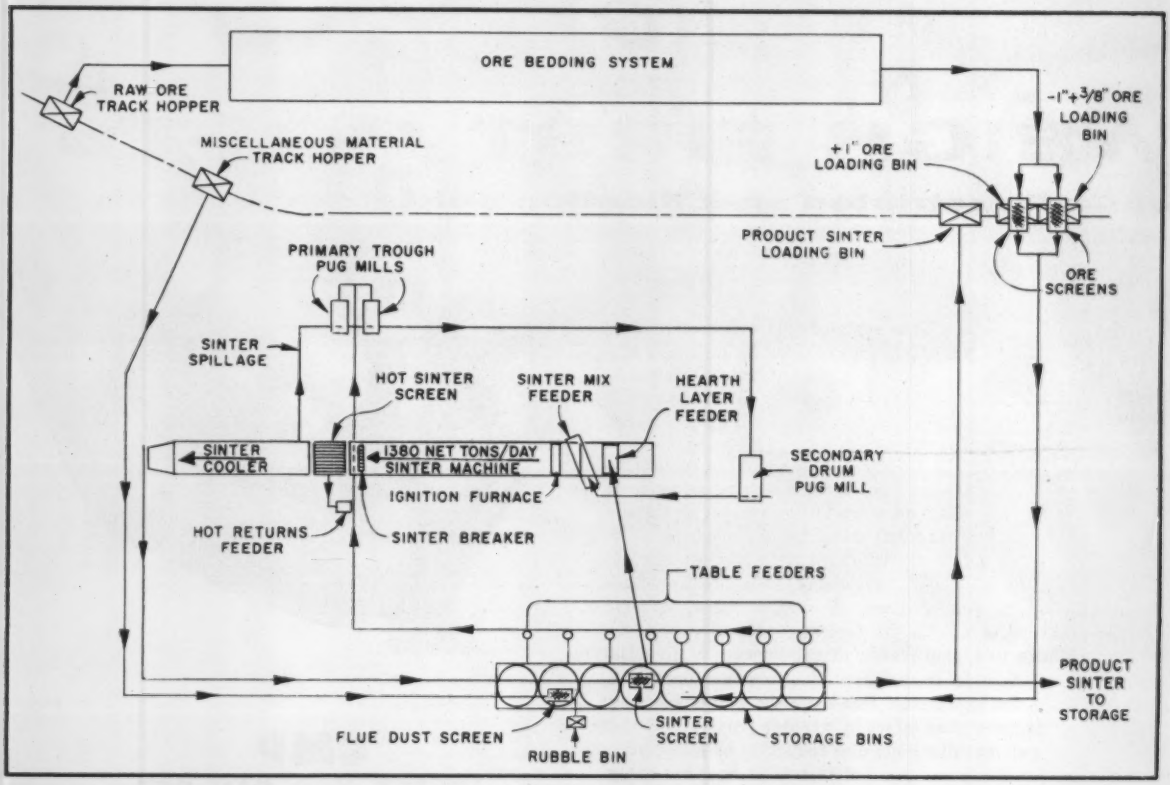


Flow diagram of Sheffield sintering plant

# Sintering Plant for Sheffield Steel

**What benefits will Sheffield Steel get from its ore bedding and sintering plant? It expects: Lower coke rate, higher production, less flue dust and better furnace operation. Savings in coke alone should pay sintering costs.**

ABOVE is the layout of the sintering plant and ore bedding system Koppers Co. Inc. will build for the Sheffield Steel Division of Armco Steel Corp. at its Houston works. It will be completed late this year.

Sheffield is adding sintering because finer ores are being supplied. The ore bedding system is needed to handle a wide range of ore types. A uniform blend of three different ores will be delivered to the screening station.

**Three Grades**—At the screening station, blended ore will be graded three ways, coarse, medium and fine. The first two will go to the blast furnace; fines will go to sintering plant storage bins.

At the sintering plant, fine ores will be mixed with reclaimed flue dust, filter cake and coke breeze—the sinter mix.

The Sheffield sintering plant will produce 1380 net tons of sinter per day. It will include: Ore screening and storage facilities; sludge recovery equipment; trough-type and drum-type pug mill equipment; an American Ore Reclamation sintering machine (6 ft x 89 ft, provided with hearth layer and sinter mix feeding equipment); and forced-air, sinter-cooler equipment arranged with handling facilities for delivering sinter to the high-line transfer car.

**Trend** — The steel industry is looking in the direction of sintering (STEEL, Sept. 26, p. 112). One big reason: As more hot metal is needed to meet expansion requirements, a high percentage of sintered ore charge can mean up to 20 per cent more output from the same blast furnaces.

"The investment cost per ton of iron produced by the addition of sintering facilities is less than that incurred by installing new blast

# The BRIDGE that took 5,000 YEARS to build...

Although bridges are almost as old as man and iron in one form or another has been in use for 5000 years, it was not until 1867 that man ventured to build anything so daring as the Eads Bridge across the Mississippi River at St. Louis. And no wonder that the engineers were eager and ready for a new material called alloy steel, because American railway bridges were falling down at the rate of twenty-five a year with the loss of much property and many lives.

So James Buchanan Eads, famed as raiser of sunken steamers and a maker of ironclad steamers for the Civil War, used alloy steel for the first time as a structural member. The Chrome Steel Company of Brooklyn submitted to him samples of steel made by the crucible process containing 0.5 per cent chromium, and was awarded the contract.

Three, five-hundred foot arches each consisting of four steel arched ribs carry two railways and a broad highway. The ribs consist of two parallel series of chrome steel tubes, one above the other and 12 feet apart. The tubes are 18 inches in diameter and about 12 feet long. Completed in 1874 at a cost of almost ten million dollars, it still stands as a monumental landmark in the development of steel.

Ohio Ferro-Alloys is proud to have had a hand in the continuing development of alloy steels. For almost a third of a century we have produced fine ferro-alloys for the steel industry.

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- LOW CARBON FERRO-CHROME SILICON
- STD. FERRO-MANGANESE
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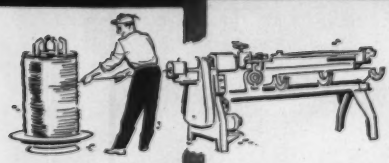

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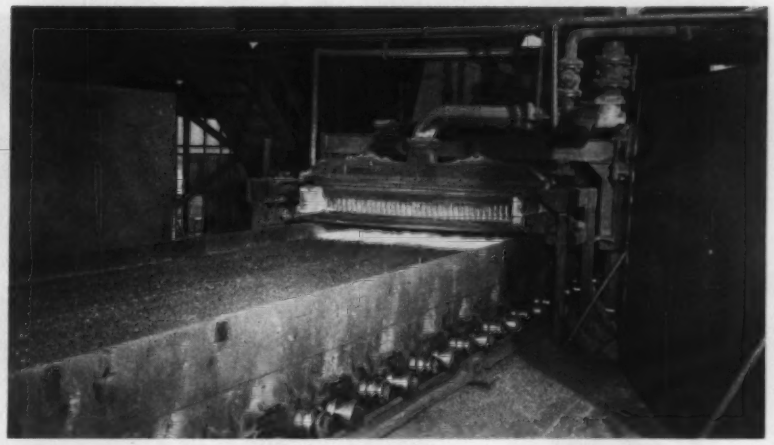


Ignition furnace in sinter machine

furnaces," says F. W. Rys, assistant manager, Freyn Department, Engineering & Construction Division, Koppers Co. Inc., Pittsburgh.

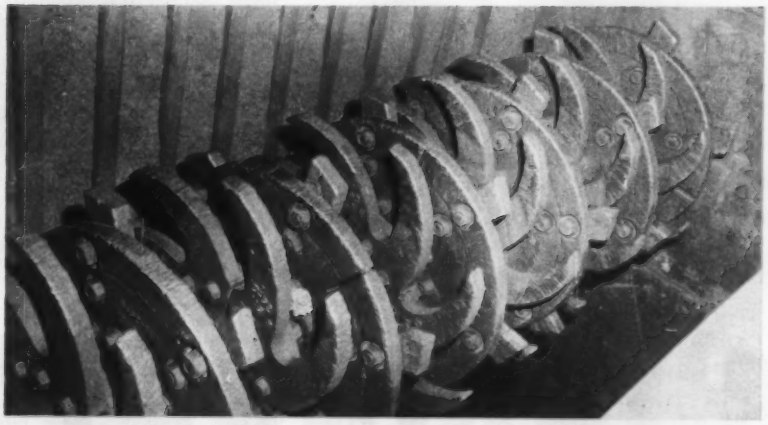
**Less Coke**—There are other benefits: Each 10 per cent addition of sinter (replacing materials which should have been sintered) in the blast furnace burden reduces the coke rate about 45 lb per net ton of pig iron produced. Those figures are based on an extensive study by Koppers' engineers in the U. S.—66 blast furnaces in 1953, 43 in 1954. All used varying amounts of sinter.

Koppers' engineers told STEEL: "Based on data obtained from other performances in the U. S. and in Europe, we feel this figure is conservative."

Sinter, they add, gives a proportionate increase in pig iron production at the same blowing rate. There is some indication that higher blast temperatures can be used, which points toward further reduction in the coke rate.

When sinter is substituted for fine ores, less flue dust is produced. The porosity of the stack column in the furnace is improved. This helps the chemistry of iron reduction. The porous condition in the stock column may allow a higher blowing rate and give an additional increase in production.

**What It Costs**—It may vary at each plant due to differences in raw materials, but should not go over $2 a ton of sinter produced, according to Koppers. (This is the conversion cost only and does not include raw materials.) The decrease in coke cost more than offsets even a maximum conversion cost of $2 per ton.



This rugged chopper wheel breaks sinter cakes (maximum size, 5 in.) at the discharge end of the sintering machine. Teeth are replaceable

# Wide Extrusions

## Wider aluminum simplifies the chore of designing anything from planks to billboards

LATEST thing in aluminum is the wide extrusion. Used for planking, floors, walls, decks, etc., the width reduces fastening problems and saves fabricating time, says Harvey Aluminum of Torrance, Calif.

Wide profile extrusions are considered sheets or plates with built-in stiffeners that save weight without sacrificing strength.

Other advantages are rigidity and the fewer joints which reduce possible liquid or air leaks.

**Uses**—A typical application is the scaffolding board. Wooden boards weigh 75 lb. Multiple use requires supports of great strength.

When made of aluminum, a scaffolding board weighs 25 lb. Only one man is needed for positioning, and the strength of supports can be cut accordingly.

Light aluminum cuts scaffolding costs by reducing erection time, maintenance and repair. Wood requires paint; aluminum doesn't.

Despite the higher initial cost, length of service and reduced maintenance add up to a 50-per-cent price advantage over wood.

### Wide Aluminum Extrusions

**Recommended applications . . .**

**Automotive—**

Decorative and structural parts

**Aircraft—**

Skins, floors; wings, fuselage, tail and bulkhead assemblies

**Buildings (Construction)—**

Panel members for siding; treads for steps and fire escapes; partition walls; panel (flush) doors; garage doors; fence gates

**Marine—**

Ship decks and gangways; superstructures

**Railroads—**

Body panels and floors for rolling stock

**Trucks—**

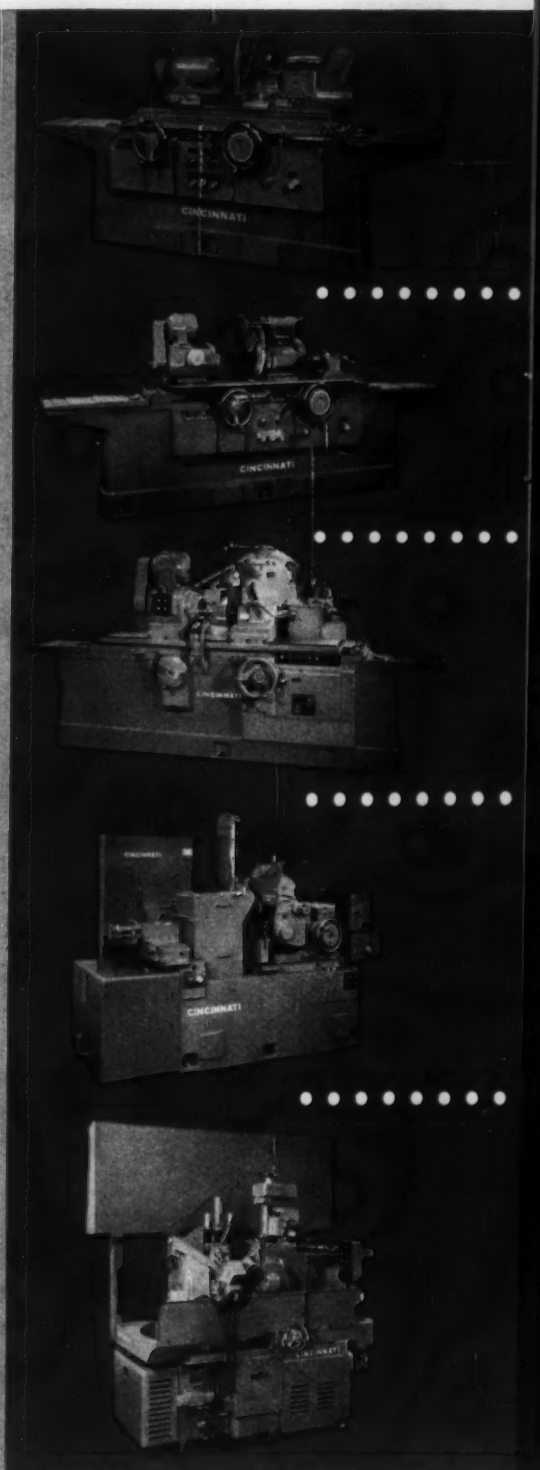
One-piece trailer body and floor members

**Miscellaneous—**

Bridge and pedestrian walks; outdoor movie screens; billboards, signs; scaffolding; bleacher and stadium benches; hollow shelves and bins for warehousing.

# Precision Preview

## for Precision Production in '56



● There's a good chance that your cost of precision in '56 can be less than it is now. Figure your costs with a sharp pencil, and compare your present precision grinding equipment with new CINCINNATI FILMATIC types. You're sure to find many cost-reducing possibilities . . . in more reliable precision . . . faster production . . . reduced maintenance charges. Replace now with new CINCINNATI FILMATIC Grinding Machines, and you can forecast a better year for your precision production. ¶ Of course, Cincinnati builds many more precision grinding machines than those illustrated here. In all, over 150 sizes of Plain, Universal and Roll Grinding Machines from 4" to 60" swing; six Centerless Grinders from 5 to 75 hp; Chucking and Micro-Centric Grinders; Surface Grinder; special grinding machines. For brief specifications, look in the latest issue of Sweet's Machine Tool File, or write to us for literature.

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HYDRAULIC UNIVERSAL
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**New CINCINNATI FILMATIC 12″, 14″ and 18″ Hydraulic Universal Grinding Machines.** New features of productivity and accuracy are incorporated in the new CINCINNATI FILMATIC 12″, 14″ and 18″ Hydraulic Universal Grinding Machines. Pick feed rates are infinitely variable, and may be engaged at the right, left, or both ends of the stroke; the footstock spindle is now chromium plated to prevent wear; headstock speeds are selected with an easy-to-turn dial; rapid cross traverse feature available. Want more information? Ask for catalog No. G-663.

CINCINNATI FILMATIC
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**New CINCINNATI FILMATIC Semi-Automatic Angular Wheel Slide Grinding Machines** drastically reduce the cost of precision cylindrical work requiring accurately ground diameters and adjacent shoulders. Both are completed in one automatic infeed cycle. These machines, built in 6″R, 10″L, 10″R and 14″L swing sizes, are equipped with Automatic Grinding Wheel Balancing. Get your copy of catalog No. G-647.

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**New CINCINNATI FILMATIC No. 3 Centerless Grinding Machines** are completely new from the floor up. Cost-reducing features include anti-friction lower slide; infinitely variable regulating wheel drive; power profile grinding wheel truing; stabilized infeed screw. Extra equipment includes automatic grinding wheel balancing and bar grinding attachments for work up to 24 feet long. Many other attachments are available, including Automatic Infeed, Feedmatic Hoppers, various types of Workrests, etc. Write for catalog No. G-664.

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**New CINCINNATI FILMATIC Micro-Centric Grinding Machines,** like their predecessors, perform the miracle of combining high production with working gage accuracy. New Micro-Centric features include magnetic drive plate which greatly reduces loading time; front handwheel control with fine and coarse adjustment positions; machine mounted cabinet for complete and accessible electrical controls. Ask for catalog No. G-662.

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*In the struggle to lower costs, improve design . . .*

# Autos Go Heavy on Light Metals

AUTO designers demand more light metals.

Aluminum and magnesium are the most popular because their lightness, easy machinability and ductility fit in with high-production, low-cost automation. Compared with iron, raw material costs are high, but closer fabricating methods and better machinability save as much as 75 per cent.

Results: A lower piece cost and a lighter car.

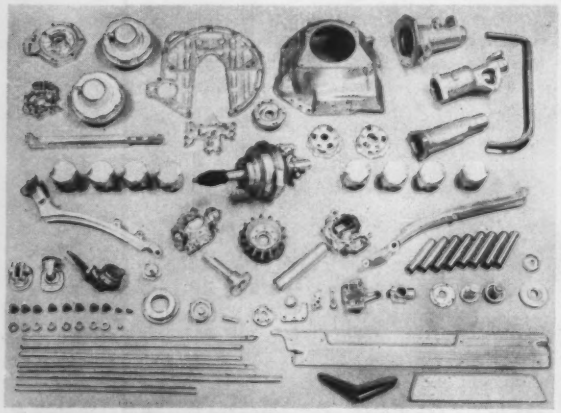
By M. F. GARWOOD & F. H. MASON
Engineering Division
Chrysler Corp.

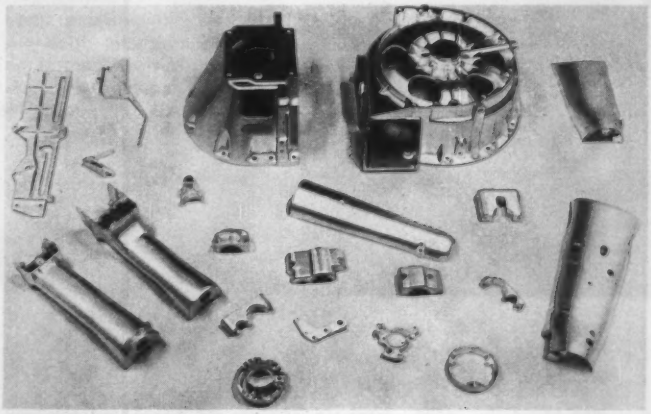
**Economy** — Cost savings frequently come from closer coring control, thinner walls and lighter weight.

The torque converter housing is a good example. Made of iron, the housing weighs 50 lb. Made of aluminum, it weighs 10½ lb. Weight reduction alone justifies the additional cost per pound of aluminum. Eliminated machining operations and equipment account for substantial savings, too.

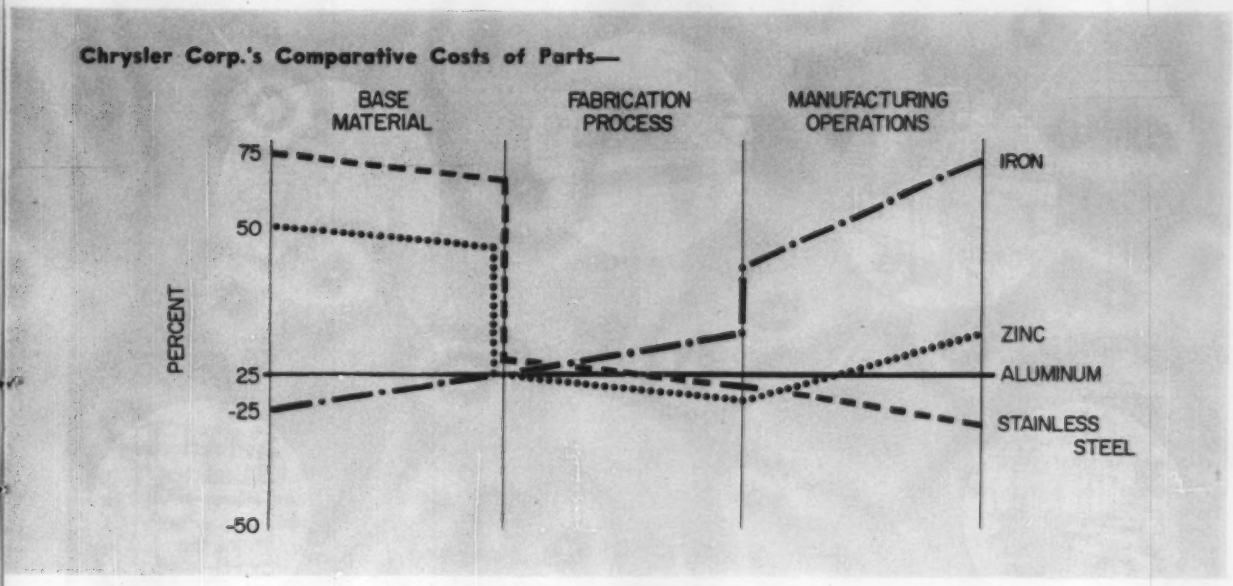
Further cost savings come from aluminum's flair for ultra high machine speeds. The higher the speed, the better the finish.

**Methods**—Permanent mold and diecasting and hot and cold extrusion satisfy all of Chrysler's production requirements. Diecasting is favored because it's fast, works





In 1926 automakers used light metals only for pistons. Today, Chrysler is using light metals for everything from decorative trim to transmission housings. A few parts are shown above: Aluminum (left) and magnesium (right)




to close tolerances and produces intricate parts with intricate coring. The transmission control valve body is a good example.

Cold impact extrusion is finding a niche. Its product replaces more expensive ferrous stampings, forgings and tubing.

The spark plug tube used to be made from tubing with multiple dies. The completed tube was plated to prevent rust. A small, mechanical press makes 60 of its aluminum counterparts a minute. Plating is eliminated.

**Designing**—The idea here: To get the most for your money, exploit the most important features of the metal.

Die-casting molds are accurate. Ribbing is used to reduce wall thickness and weight. A long, thin, tubular part is a natural for cold extrusion: Aluminum and magnesium are both highly ductile.

Aluminum is bright and clean, making it a natural for decoration. Chrysler uses a great deal of the metal for interior and exterior moldings. Brushed, polished and plain or colored anodic finishes will be used increasingly.

Light metals have a low density that reduces tool wear. Low heat content means less heat in casting and increased casting speed. A low melting point means a lower operating temperature and longer equipment life. High thermal conductivity means quicker heating and cooling in operations like heat treatment, soldering, etc.

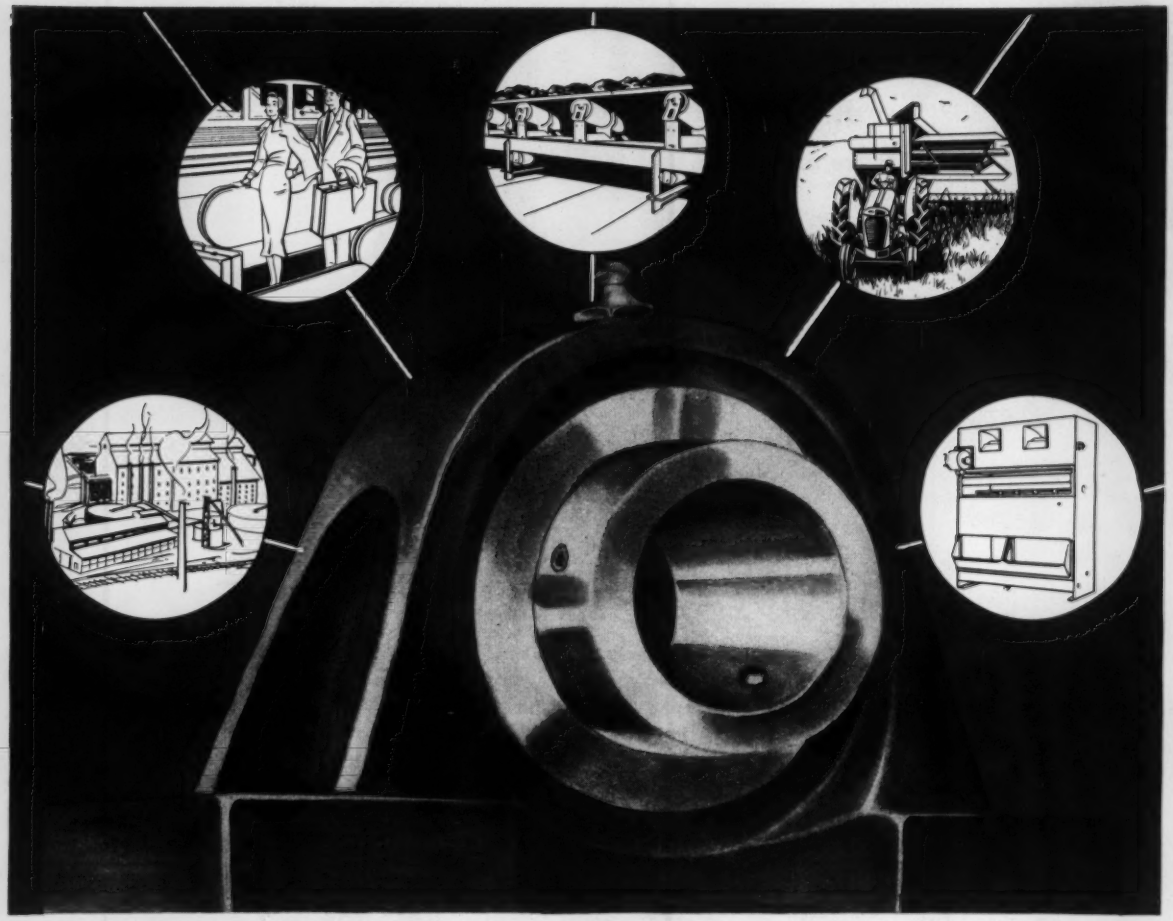
The part is designed so that it can be used as-cast or as-fabricated. Machining or later operations should be held to a minimum.

**Materials**—If a clear anodic treatment is required, raw materials are selected with a minimum of iron, copper and silicon to eliminate fogging and dullness. Otherwise, only one basic aluminum alloy is necessary for castings—

## Cast Iron Versus Aluminum Converter Housings

| CAST IRON | ALUMINUM DIE CASTING |
|---|---|
| 1. ROUGH DRILL BOLT HOLES | ELIMINATED |
| 2. SPOT FACE BOLT BOSSES | |
| 3. ROUGH DRILL STUD HOLES | |
| 4. TAP STUD HOLES | TAP STUD HOLES |
| 5. ROUGH TURN TOP FACE-1/8" | FINISH GRIND BOTH FACES-0.030" ONE OPERATION |
| 6. FINISH TOP FACE-1/32" | |
| 7. ROUGH TURN BOTTOM FACE-1/8" | |
| 8. FINISH BOTTOM FACE-1/32" | |
| 9. ROUGH BORE PILOT DIAM-1/8" | ROUGH BORE-0.030" |
| 10. FINISH PILOT DIAM-1/32" | FINISH |

Chrysler Corp.



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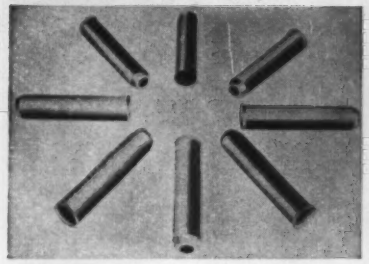

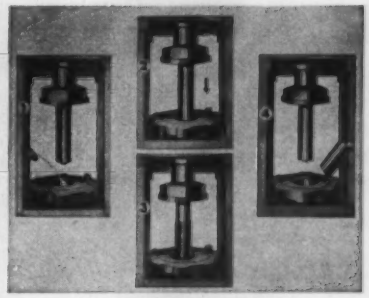

Spark plug tubes used to require tubing, several die operations and a final plating. Cold impact extrusion smacks them out of aluminum at a fraction of the former cost

8-per-cent silicon, 3-per-cent copper. Most castings of this material will not require heat treatment.

Wrought aluminum alloys, such as 2-S, 3-S, 57-S and 63-S, fill the needs for most decorative parts. Mechanical brushing, embossing, extruding and rolling with decorative patterns provide infinite variety for automobile trim schemes.

**Wear**—Light metals sometimes don't wear well. Chrysler has found that satisfactory service is obtained by using a hardened surface for the part in contact with the aluminum. Occasionally, a break-in coat of tin helps. Anodic coatings shouldn't be used for the aluminum, even if rough surfaces and high loading prevent brittle break-up. Anodic coatings wear poorly and seize.

Magnesium, although a good bearing material, is sensitive to load or lubricating film failure and surface roughness. Better protection is required: More lubrication and better surface finishes.

**Corrosion**—Don't be afraid of corrosion. Protective coatings on functional parts are not necessary for all normal automotive service. The resistance of cast magnesium to corrosion is also adequate.

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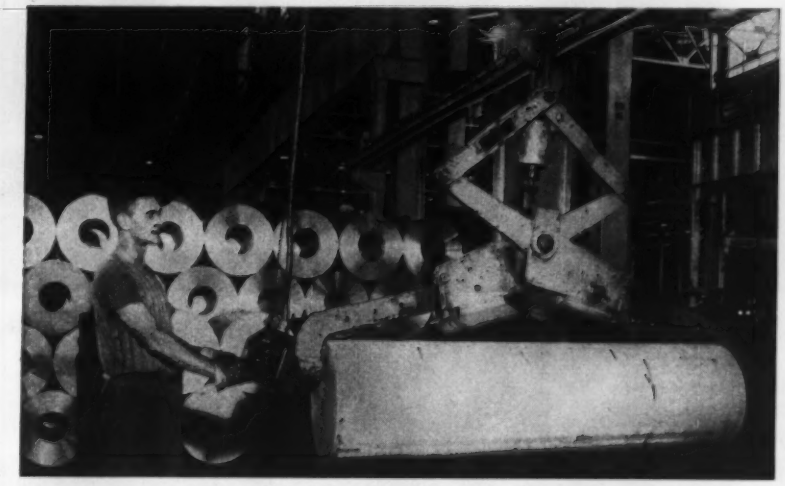

Handling is a breeze with tongs like these. Operator never touches the load; a built-in cam opens and closes the jaws automatically. Tongs are hoisted by a semigantry crane that works independently of the overhead crane

# Solves Handling Problem

## An auxiliary, semigantry crane, plus roller conveyors, solved this plant's need for more overhead service. Saved—one large, overhead crane

THE CARE and feeding of a 14,000-ton extrusion press for aluminum involve the handling of ingots that weigh 1½-tons. When Alcoa installed the press at its Lafayette, Ind., plant, it found the feeding problem—materials handling—called for additional equipment.

**Auxiliary Crane**—To carry ingots to the press, vee-shaped roller conveyors were installed in the 80-ft storage bay. The only available equipment large enough to handle the ingots was a single, large overhead crane, which was needed for other handling problems.

A semigantry crane, complete with Heppenstall tongs designed for the ingots, solved the problem. This crane operates independently of the larger, overhead crane that serves the whole storage bay.

**Automatic Feature** — Lifting tongs were adapted from similar designs that are familiar to the steel warehouses as coil lifters. Lowering the tongs onto the work trips a cam which permits the leverage to close the tongs tightly against the work. Pressure seven times the load weight presses the shoes together to prevent slippage. The cam releases the tongs automatically when the load is deposited.

**Serves Other Needs** — Several other similar tongs are in use throughout the plant. After ingots are cast, the operator can lift the piece without getting near the intense heat. The tool and die department handles 5-ton die blanks quickly and easily. Die setters get a quick lift when replacements are needed in the extrusion press.

Mr. H. T. Anderson, Jones & Laughlin Lubrication Engineer and Gulf Sales Engineer C. D. Gilchrist discuss lubrication of the 11-inch rod mill. Gulf E.P. Lubricants provide effective protection for the pinion stands and gear drives, while Gulf XXX Lubricant safeguards the roll neck bearings.

Finishing train pinion stands also get effective lubrication with Gulf E.P. Lubricants.

# Jones & Laughlin uses the extreme pressure lubricants that provide *protection plus*...

# Gulf E. P. Lubricants

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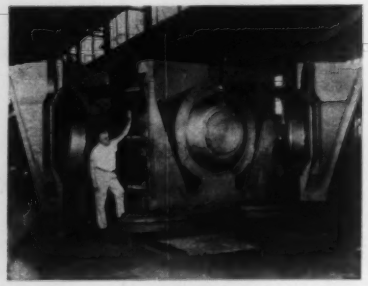
# Permanent Molds

**Big aluminum castings can be cheaper. This founder tried a permanent mold and got big results and bigger castings**

PERMANENT MOLDS that replaced sand molds for aluminum castings increased production more than 800 per cent at Harsch Bronze & Aluminum Foundry, Cleveland. Bigger castings (780 lb now vs. 350 lb before) can be made, too.

The need for a better method came with the production of hollow turboblower rotors. The body and internal flanges of the sand mold had to be covered with chills. To speed production and meet a new specification that called for a 10-per-cent improvement in physical properties, a permanent mold

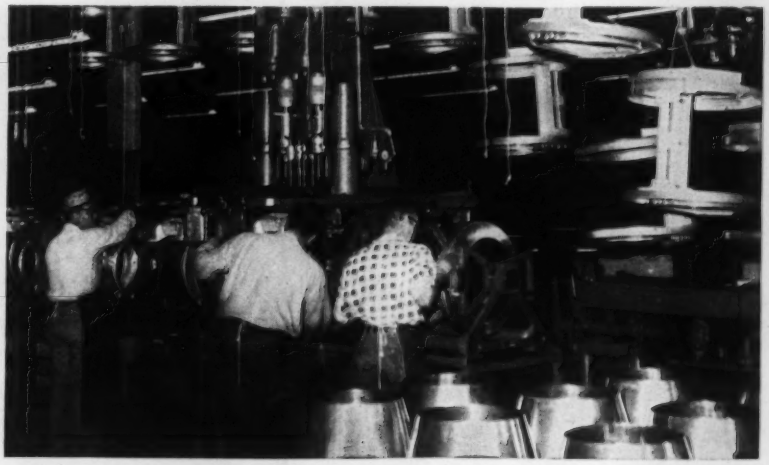


**MEEHANITE**
***...permanent mold improves aluminum***

was designed and cast. Meehanite was chosen because of its high strength at elevated temperatures, its rigidity, high resistance to corrosion, wear, thermal shock, warping and washing.

Permanent mold life for this application is 2500 castings. In addition, the surface finish of completed castings is greatly improved.

Experience with permanent molds proved that large-dimension aluminum castings can be produced at about half the cost of sand molds. Using sand molds, seven men produced only four castings a day. Four men now make 20 a day. Floor space requirements are cut in half, and the need for coreroom floor space is eliminated. A collapsible iron assembly replaces cores.



Bulkheads and upper intercostals are assembled and drilled on rolling fixtures in an assembly rack and drilling machine setup

# Tooling Turns the Trick

A JETTISONABLE fuel tank every 4 minutes. That's the goal set for a new assembly plant at Pastushin Aviation Corp., Los Angeles.

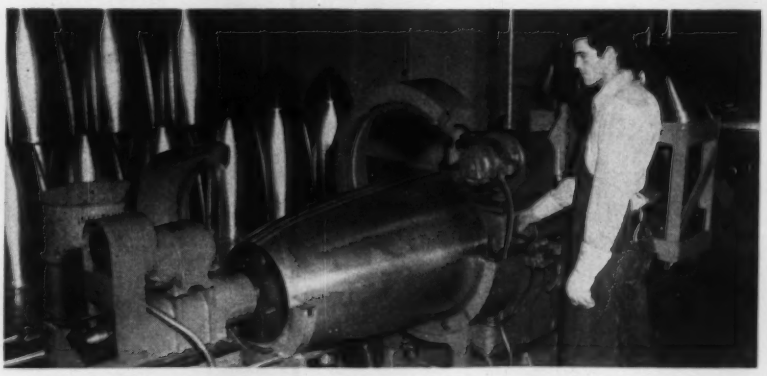
The plant utilizes special semiautomatic tooling, handling equipment, gaging and machine controls. It is operated by 48 empoyees.

**Heavy on Metal**—In full operation, the assembly line uses nearly 10 tons of aluminum alloy during an 8-hour shift. Detail fabrication (bulkheads, intercostals and other sheet metal, cast and forged parts) is done outside the main work area which covers a space 40 x 100 ft.

In the first production operation, sections are rolled into conical or cylindrical shapes and are conveyed to the line welder which welds the longitudinal seam. The weld is rolled flat to produce uniform thickness. Then the center section goes to a subassembly area where bulkheads and internal structures are installed. Tail and nose sections go to bulge forming machines.

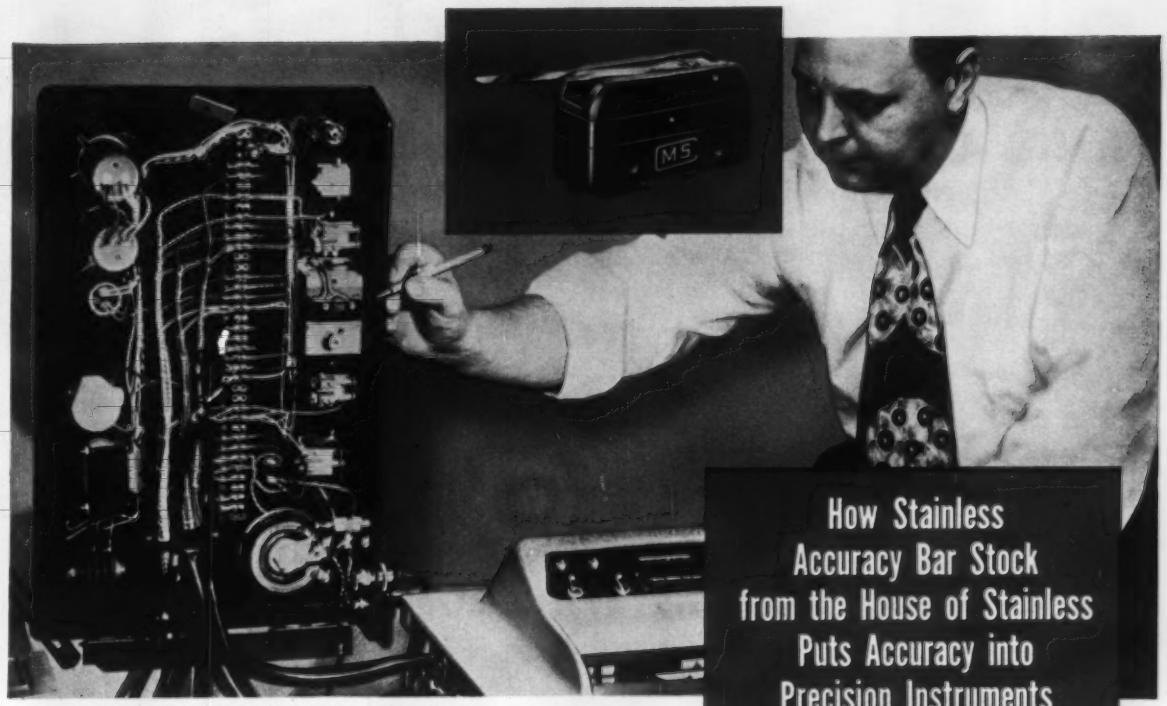
**Trimming**—Nose and tail skins are trimmed on special machines which produce a true surface for subsequent joining of other sections. At this point, sheet metal spinnings for nose and tail cones come to the line where they are joined to the nose and aft sections by automatic heliarc welders.

The critical operation is the joining of center and aft sections by two special welding machines. A pressure check is the final operation.



Skin trim machine locates and trims both ends of forward section to diameter and length and drills drain hole

# ACCENT ON ACCURACY




Photo, courtesy MICRO SWITCH, Freeport, Illinois

## How Stainless Accuracy Bar Stock from the House of Stainless Puts Accuracy into Precision Instruments

**THE NEED**—In producing their precision switches, MICRO SWITCH, a division of Minneapolis-Honeywell, had to have a material with extremely close tolerances to satisfy both the manufacturing and operating requirements of these small, snap-action precision instruments.

**THE ANSWER**—Special stainless accuracy bar stock from the House of Stainless proved to be the answer to MICRO SWITCH'S rigid requirements. Not only does this special stainless bar stock meet the close tolerances demanded, but in addition, it provides extra strength and corrosion resistance so vital to uninterrupted performance in the finished product.

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As the name implies, the House of Stainless is truly your logical source for whatever stainless you may need—whether it's a special accuracy bar stock like this, or any other kind of stainless. Our long experience with this material, our comprehensive warehouse stocks and our mill placement facilities combine to distinguish this service in the field.

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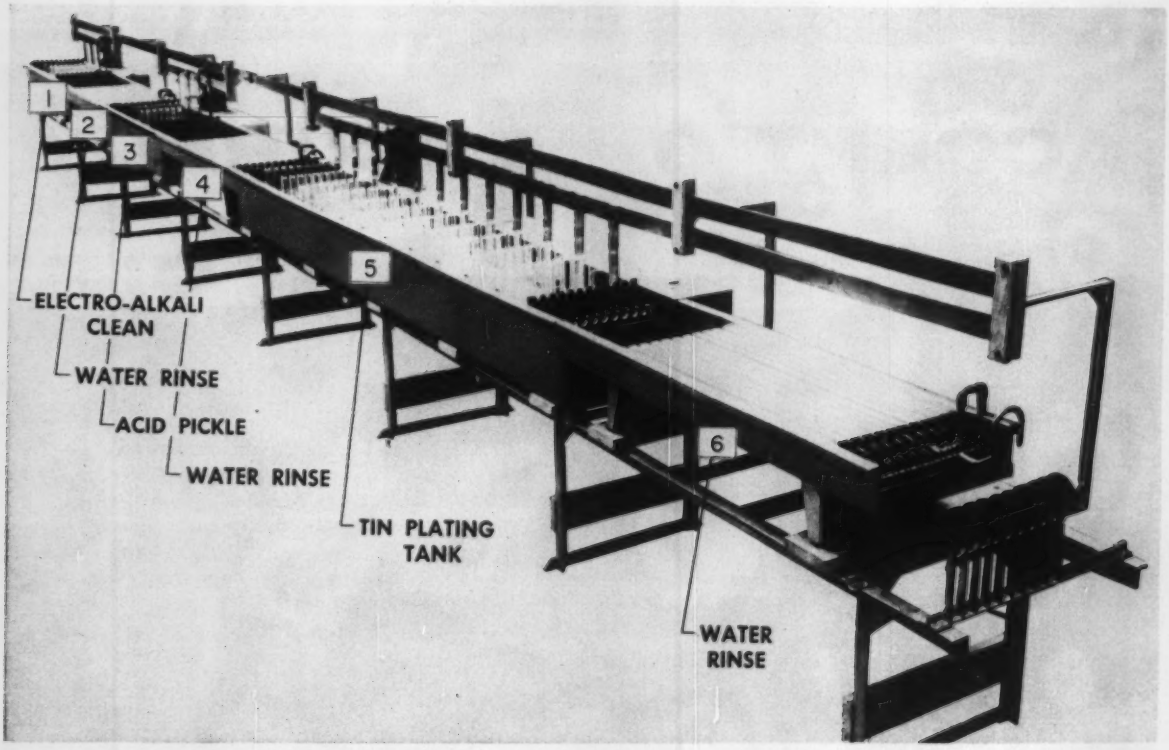



Electrotinning line for copper wire using stannous fluoborate bath

# Electrotinning Tightens Wire Coating Control

TIN IS SAVED. A thinner, more uniform coating is produced.

There are two reasons why electrotinning of copper wire (as a substitute for hot dipping) is creating interest.

The electrical industry uses tinned copper wire in great quantity. Tin is a barrier to prevent corrosive elements in the insulation from attacking copper. It also makes for easy soldering.

**New Line**—The American Electroplaters' Society recently previewed a wire plating line in Cleveland that was developed for use with stannous fluoborate. Tin savings of about two-thirds are claimed for it. It has features which can be adapted to present plating lines (for details, see box).

Fluoborates are employed for copper plating steel wire for the telephone industry and lead plating stainless wire for drawing. They are stable, have high speed characteristics and are easy to use.

**Economy**—Following each tank in the line are provisions for wiping the wire with air or dies—to prevent drag-out and drag-in from one tank to another.

The critical tanks are those before and after the tin plating tank (economy demands keeping the loss of plating solution to a minimum). Diamond dies set in Lucite have been used for this purpose. Having a diameter 0.0005 in. greater than the wire, they follow each tank.

The plated wire may be brightened by burnishing through a die 0.0005 in. smaller than the wire after leaving the last water rinse. When wires finer than No. 24 are desired, heavier gages (Nos. 12 to 20) should be plated with heavier deposits of tin and subsequently drawn to the final size and annealed.

**Electrical Contacts**—The system may be operated by completing the circuit through the cathodes in the alkali and acid tanks where the wire is positive, and through the anodes in the plating tanks where the wire is negative. No direct contacts on the wire are required.

When plating heavy tin deposits (about 0.0001 in. thick on a No. 20 wire), it is advisable to install roller-type electrical contacts on the alkali tank and tin tank, using the 10 per cent fluoboric acid as the soak pickle.

**Space Requirements**—The line, including storage tanks for alkali, acid and tin plating units, is about 3 x 1½ x 45 ft. It will process ten wires at a time, on 2-in. centers.

All tanks, except the water rinses, are provided with slotted Lucite separators to prevent whipping of the wire when traveling through the line.

Pure cast tin anodes are recommended. The addition of catechol will minimize the oxidation of stannous to stannic tin. The high free fluoboric acid assists in anode corrosion and promotes stability of the bath.

## How To Set Up a Wire Electrotinning Line

1. **Electroalkali Clean**—Steel or stainless steel tank, 6 to 8 ft long, including overflow sections at either end. Alkali solution is heated 200 to 212°F in a storage tank attached to the cleaner tank and circulated by a deep well-type pump, so it flows over the slotted Lucite dams at the end of the tank and back to storage. Sodium cyanide (1 oz per gal) may be added to the solution to facilitate cleaning. The wire is made the anode and the tray in the tank the cathode.

2. **Water Rinse**—Stainless steel tank 6 to 8 ft long, including overflow sections at either end. Contains a tray with cypress or redwood strips 1½-in. high x 1 in. thick bolted to it, providing troughs through which the wire travels countercurrent to jets of water which overflow through slotted Lucite dams and then to the sewer.

3. **Acid Pickle**—Steel or stainless tank, lined with rubber or Koroseal, 6 to 8 ft long, including overflow sections at either end. To make the acid an electropickle, a 2.5 per cent fluoboric acid solution is employed, making the wire the anode and the carbon plates in the rubber covered holding tray the cathode.

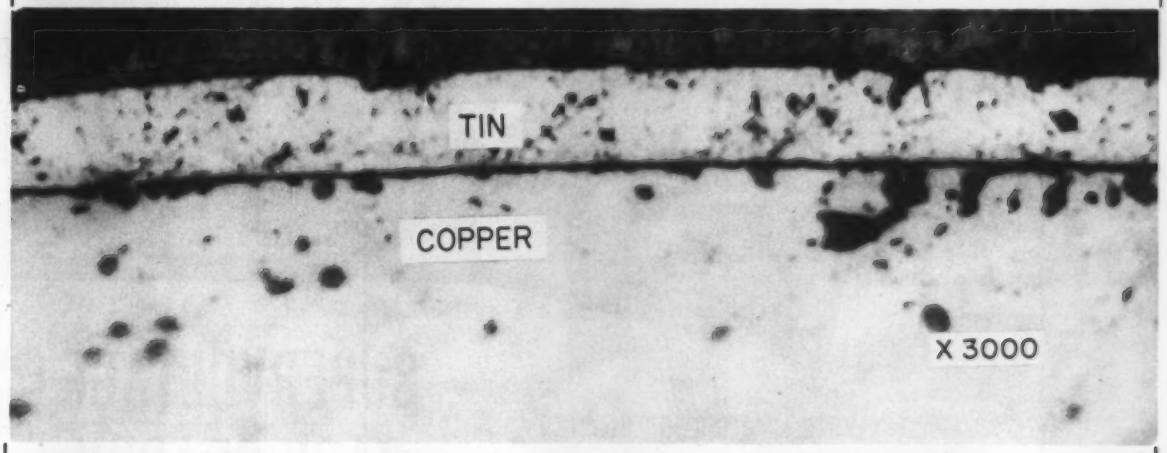
For a soak pickle, a concentration of about 10 per cent fluoboric acid is needed. Circulation of this tank is the same as the electroalkali cleaner.

4. **Water Rinse**—Same as No. 2.

5. **Tin Plating**—Tank 14 ft long, including overflow troughs at either end, may be of steel or stainless steel lined with rubber or Koroseal. Attached storage tank is equipped with a deep well-type pump to circulate the bath. Slotted Lucite dams at either end maintain solution level and permit overflow to return to storage.

The tray on which the tin anodes are placed should also be covered with rubber or Koroseal, except the inside portion which makes electrical contact. A heater is installed in the storage section.

6. **Water Rinse**—Same as No. 2.



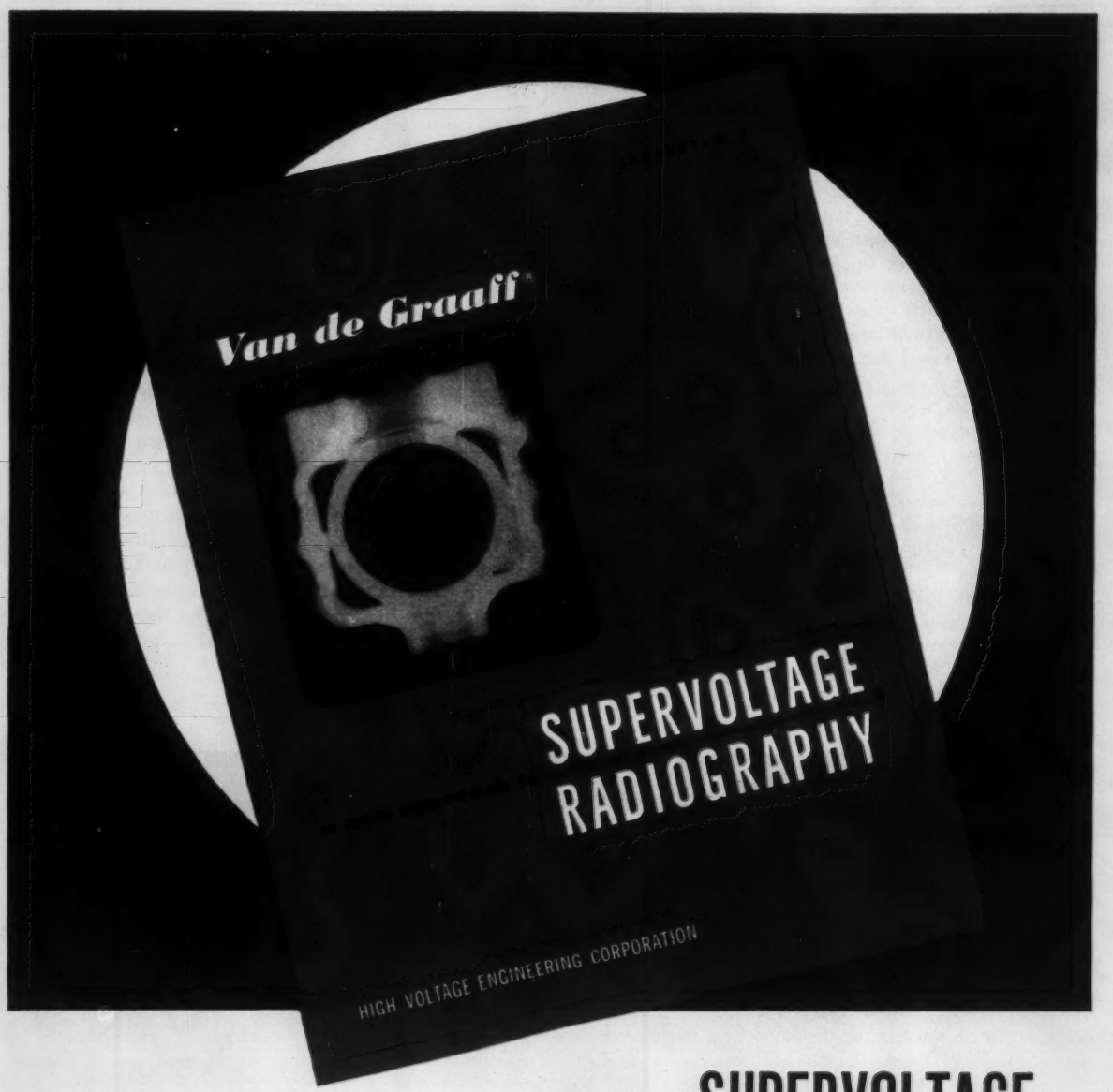

**Fluoborate Solution for Electrotinning**

| | Ounces Per Gallon |
|---|---|
| Stannous fluoborate, $Sn(BF_4)_2$ | 26.8 |
| Free fluoboric acid, $HBF_4$ | 26.8 |
| Tin | 10.8 |
| Gelatin | 0.4 |
| Beta naphthol | 0.065 |
| Catechol | 0.065 |

**Electrotinning of Copper Wire in Fluoborate Bath**

Speeds and Current Densities:

| Size Wire No. | 14 | 20 | 20 |
|---|---|---|---|
| Diameter, Inches | 0.06408 | 0.03196 | 0.03196 |
| Plating Length, Feet | 12 | 12 | 12 |
| Area, Square Feet | 0.02010 | 0.1002 | 0.1002 |
| Feet per Minute | 500 | 500 | 350 |
| Amperes per Wire | 117 | 58.6 | 133 |
| Amperes per Square Foot | 583 | 583 | 1350 |
| Tin Thickness, Inches | 0.00003 | 0.00003 | 0.0001 |

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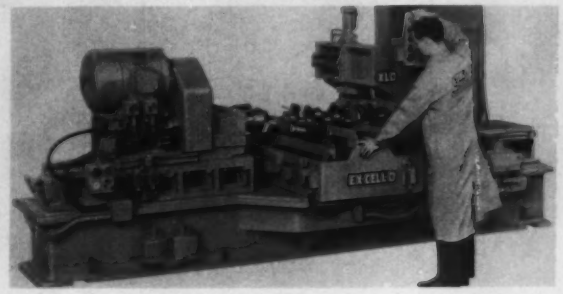
## Simultaneous Operations Cut Crankshaft Machining Costs

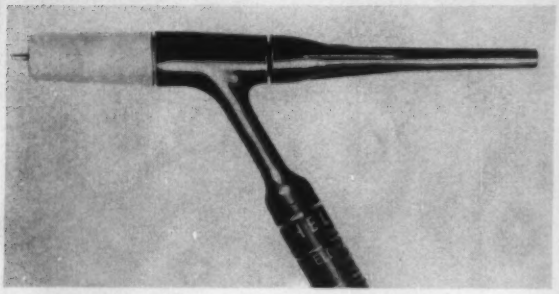
This machine does triple operations at the same time on two crankshafts. It is loaded and unloaded automatically.

Operations include finish boring a diameter to ±0.0005-in. (and holding the bore concentric with the main bearings), facing a surface square with the main bearings and chamfering an edge.

The machine uses two standard hydraulic slides mounted on a base with a fixture between them. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900



## Lightweight, Air-Cooled Torch Has Capacity Up to 150 Amp



The Heliarc torch for inert-gas, shielded-arc welding of light metals has a continuous-duty current capacity of 130 amp.

It will join steel and hard-to-weld metals, such as aluminum, magnesium, stainless steel, Monel, copper brass and high-alloy steels.

High quality welds needing little or no finishing are obtained because inert gas shields the immediate weld area. *Write*: Linde Air Products Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 7-8000

## Fork Truck Attachment Handles Both Crates and Cartons

A finger lift device, plus a special addition, provides palletless handling of crates and drum-type cartons.

The finger lift attachment mounts 40 spring-loaded fingers across the top. As the attachment contacts a crate, the fingers which meet crate members are pushed back against their springs. Those which find no obstruction enter the crate. When the attachment is lifted, fingers engage crate members.

Two vertical, swiveled plates mounted above the fingers are used to pick up cap-and-tube or drum-type containers.

In this type container, about 4 in. of the container wall is folded outward at the top. The carton top, or cap, fits down over the fold, forming the carton lip.

Plates of the attachment slip between the wall and the fold when lifting. They are pivoted about their centers, making it easy to lift two cartons at once. *Write*: Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, O. *Phone*: Olympic 1-3000

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# . . . about punched cards

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When you're using a PENTON publication you know how many worthwhile *units* are reached. Coverage reported on the S.I.C. basis enables you to measure it in relation to the total number of units. You can evaluate the proportion of the market buying power you are reaching, because information on size or type of establishments is also reported.

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*All manufacturers use this system in reporting to the U. S. Bureau of the Census.

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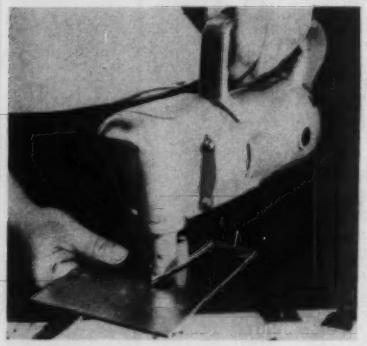
This 13-lb nibbler cuts stainless steel up to 10 gage, milder steels and nonferrous metal to 8 gage.

The tool cuts without distortion or excessive burring. It will follow patterns or templates and cut from any angle. It also cuts contoured or corrugated stock. Minimum cutting radius is 6 in.



Cutting action comes from a tool steel punch and die set which takes a ¼-in. bite at each stroke. Speed at full load is 600 strokes a minute. *Write*: Fenway Machine Co., Edgemont and Clementine St., Philadelphia 34, Pa.

### Leak Checker

Molten or gaseous leaks in thermocouple protection tubes immersed in liquid materials are detected by this instrument.

It prevents inaccurate temperature readings and control in salt bath and melting furnaces.

The unit uses the conductivity of molten or gaseous salt or metal to indicate leaks. A special warning circuit connects the thermocouple lead wire with the bath tank. Molten material leaking into the protection tube from the tank closes the circuit.

A warning light goes on when a button is pressed if a leak has closed the circuit. *Write*: Electronics Division, Peerless Electric Co., Warren, O. *Phone*: 3155-1

**Do you save money when you by-pass your distributor?**

See Page No. 20

### Flooring

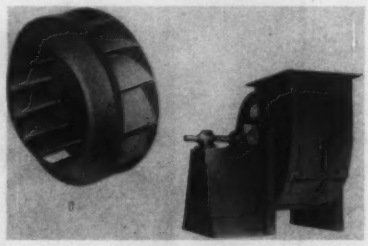
A dust-free, corrosion-resistant floor is formed by Metal-Flex. It withstands rapid changes in temperature and is oil and grease resistant.

Because of its low porosity, the floor holds destructive materials on its surface, assuring long life and easy cleaning. *Write*: Flexrock Co., 3630 Filbert St., Philadelphia 4, Pa. *Phone*: Baring 2-5500

### Centrifugal Fans

A backward-curve, nonoverloading fan is said to be 92-per-cent efficient. It operates on 35 per cent less power than needed by convential, flat-blade fans. Noise level is reduced 65 per cent.

The hollow-sectioned, aerodynamic-shaped blades eliminate eddy currents.



Spun aerodynamic inlet cones reduce air turbulence and increase operating efficiency.

Wheel sizes are from 13½ to 143 in. in diameter. Air deliveries are from 600 to 1 million cfm. *Write*: Chicago Blower Corp., 9869 Pacific Ave., Franklin Park, Ill. *Phone*: Gladstone 5-4780

### Aluminum Chain

Welded aluminum chain is nonsparking and nonmagnetic. It is extremely light and has excellent resistance to corrosion.

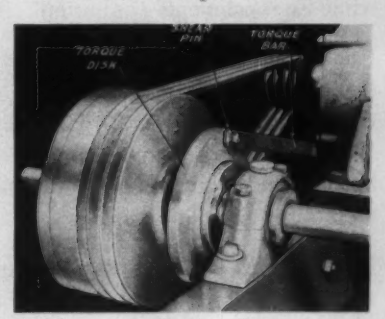
Size for size, its working load limit is about 60 per cent that of welded steel chain; its weight is 65 per cent less than steel chain.

It comes in color anodized finishes. *Write*: McKay Co., 330 McKay Bldg., Pittsburgh 22, Pa. *Phone*: Atlantic 1-5380

### V-Belt Pulley

This pulley eliminates the need for special auxiliary gear reduction units; it is equipped with built-in gear reductions.

Standard reductions range from 7:1 to 700:1; reductions of 8000:1 are available on special order.




The reduction pulley can be supplied as a plain speed reducer, with friction clutch added, or as a two-speed reducer clutch. It can be operated either horizontally or vertically. *Write*: Hart Reduction Pulley Co., 426 W. Main St., Waukesha, Wis. *Phone*: Division 2-7810

### Chain Hoist

An 11-lb midget hoist can lift 250 lb 30 ft in 1 minute.

It has a standard lift of 7 ft and a minimum distance of 9 in. between hooks.

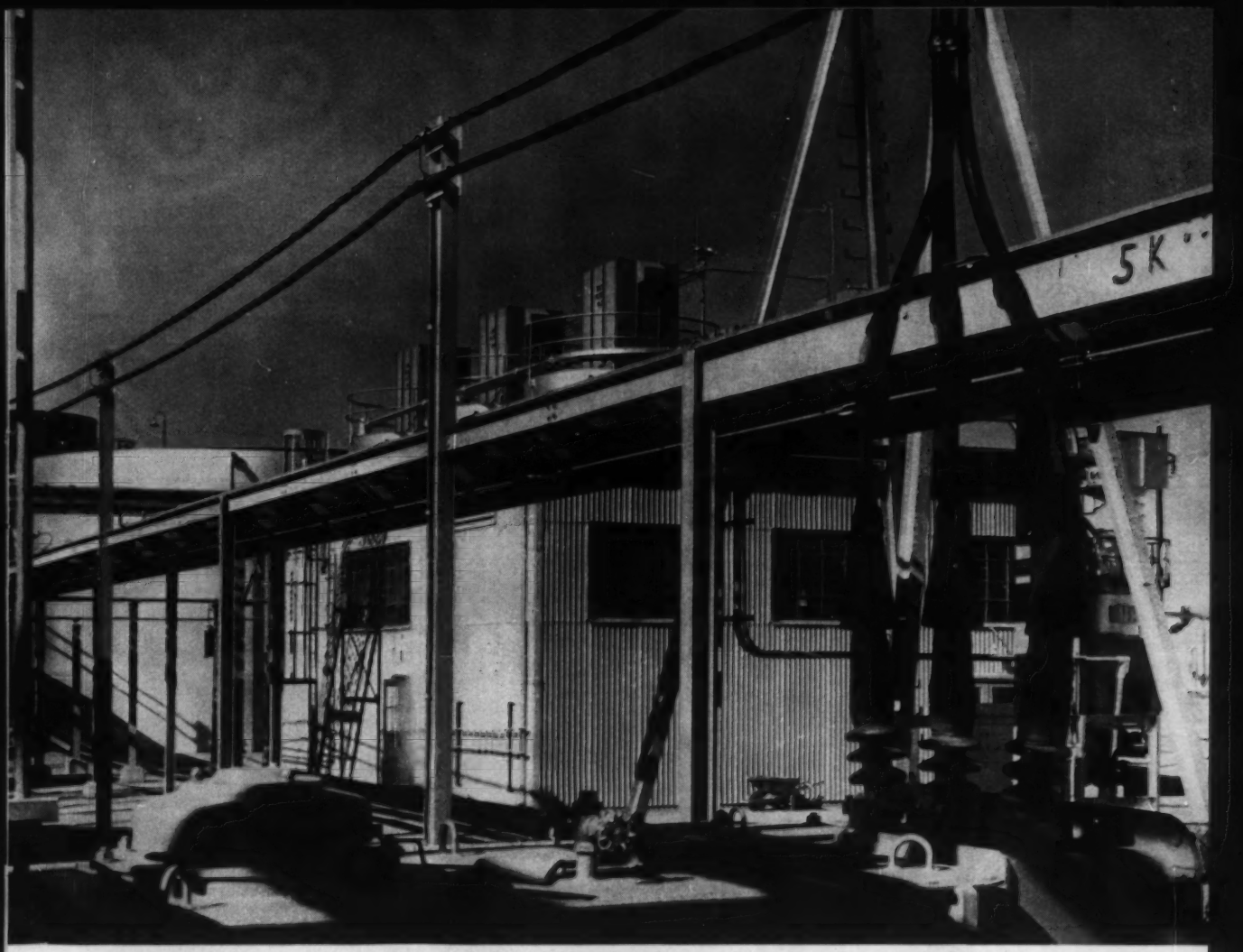
Ball-bearing trolleys also are rated at 250 lb. They are made to fit 3 to 10 in. standard I-beams. The trolleys have carburized, hardened wheels and grease seals for protection from dust and dirt.

Diameter of the wheel tread is 2¼-in. The trolley weighs 12 lb. *Write*: Coffing Hoist Division, Duff-Norton Co., Danville, Ill.

### Resin Coating

Here is a coating, Glid-Iron, for maintaining and upgrading wood, metal and masonry surfaces.

It is highly resistant to chemicals and has excellent adhesion to wood, metal and concrete. It will



**Heads above the crowd,** Anaconda Aerial Cable makes a fast, neat, low-cost installation at oil refinery.

# How to handle high voltage with a low overhead

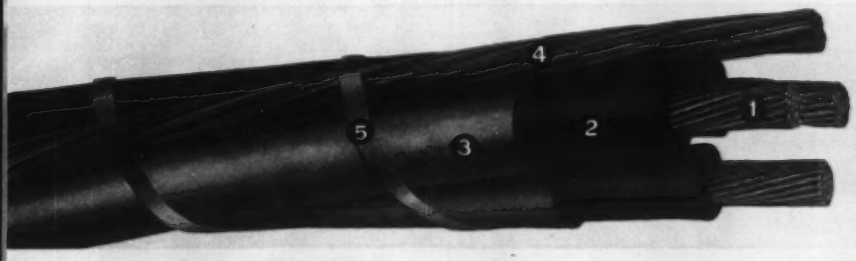
**Anaconda Aerial Cable goes *over* crowded areas . . . gives highly reliable service at low cost.**

Pipes and other underground structures often make installation of ducts or buried cable costly and difficult. The ideal answer: Anaconda Aerial Cable.

See how easy it is to install—no ducts, crossarms or insulators are needed. Even if underground obstructions are not a factor, this rugged neoprene-jacketed cable costs much less than buried systems.

Neoprene jacket resists weather and abrasion. Special Anaconda Type AB butyl high-voltage insulation gives extra protection against ozone, heat, moisture and fumes.

For the full story, call the Man from Anaconda or your nearest Anaconda distributor. For information on Aerial Cable write to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 56287




1. **Conductors—copper or aluminum**
2. **Ozone-, moisture- and heat-resistant butyl insulation**
3. **Neoprene weather-resistant jacket**
4. **Messenger**
5. **Binder Tape**

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*OFFICE ONLY


## NEW PRODUCTS and equipment

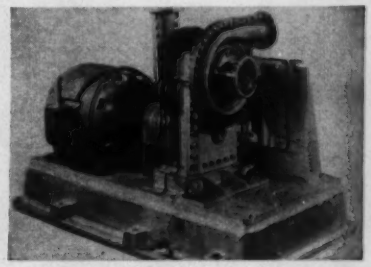
smooth out and bridge small cracks.

After curing overnight at normal room temperatures, it sets to a hard, tough, flexible and scuff resistant finish.

The material may be applied by spray, brush, roller or squeegee. It withstands temperatures from −20 to 212° F. *Write*: Glidden Co., Cleveland, O. *Phone*: Woodbine 1-8300

### Centrifugal Compressor

Clean, oil-free air for instrument air systems, and process air comes from a new low-flow compressor.

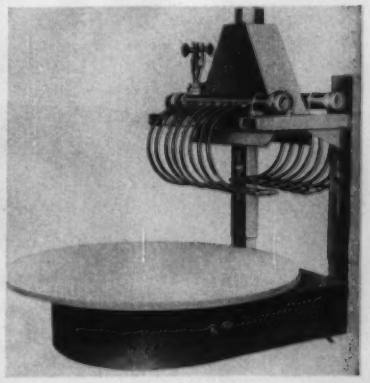


Various models give flows from 350 to 2000 cfm (static) delivered at 65-psi absolute. Low flow and high pressures are provided. *Write*: Sawyer Bailey Corp., 1559 Niagara St., Buffalo 13, N. Y. *Phone*: Summer 2300

### Turntable Heating Unit

Small parts that need to be brazed, soldered, annealed or hardened are held by simple fixtures on this power-driven turntable.

As the turntable revolves, parts are passed between two rows of burner nozzles. Heat input is con-



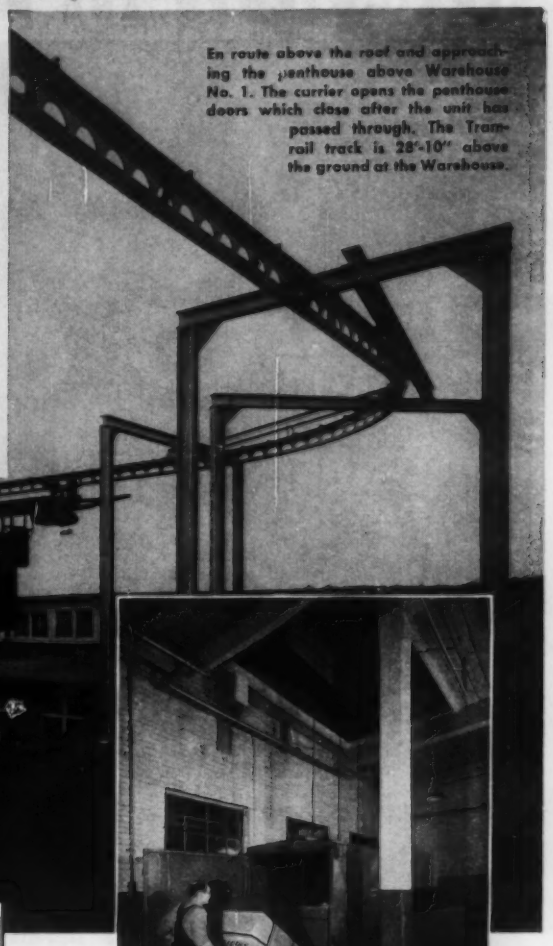
# Uses Roof To Link Distant Departments

## Automatic Tramrail System Saves "240 Man-Hours" Per Week

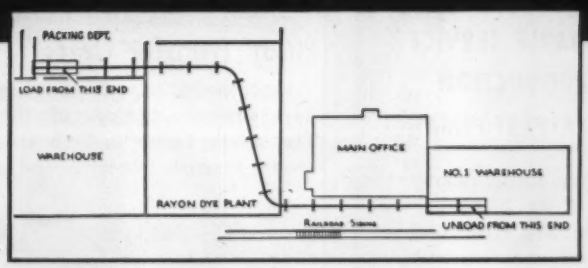
By installing a Cleveland Tramrail automatic dispatch system that extends partly over roof tops and partly between buildings, the North Carolina Finishing Co., Salisbury, N. C., was able to successfully link two widely separated departments and secure the same advantages that would be obtained if they were adjacent to each other.

This system has been in operation since 1949. It is an excellent example of the application of a bit of imagination to overcome an awkward and costly materials handling situation. It reduces the time for movement of packaged rayon cloth from the Packing Department to the No. 1 Warehouse by 240 man-hours per week.

A wide variety of Cleveland Tramrail automatic dispatch systems is now serving industry. For real savings we suggest that you get the facts on this modern method of handling materials.



En route above the roof and approaching the penthouse above Warehouse No. 1. The carrier opens the penthouse doors which close after the unit has passed through. The Tramrail track is 28'-10" above the ground at the Warehouse.




6 to 8 cartons weighing 100 to 400 lbs. each are loaded into the Tramrail freight van. The button on wall, at left, sends the van on its way, first upward through ceiling opening, and then forward on outside roof track. The van measures 4'-0" x 8'-0" x 6'-6" high.

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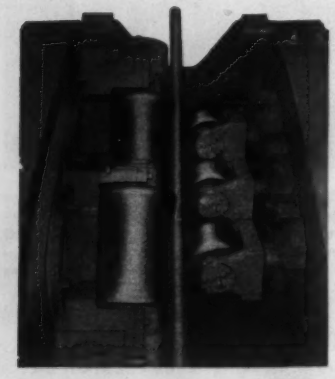
THE CLEVELAND CRANE & ENGINEERING CO.
7805 EAST 290 ST. WICKLIFFE, OHIO

**CLEVELAND TRAMRAIL**
**OVERHEAD MATERIALS HANDLING EQUIPMENT**

HIGH SPEED SUTTON 5-Roll
STRAIGHTENER AND POLISHER

MODEL 1½ FX
(Pictured)
BARS from
5/16" to 2½" Dia.
TUBES from
5/16" O.D. to 3" O.D.
OTHER SIZES AVAILABLE

FOR FAST AND ACCURATE STRAIGHTENING AND POLISHING OF COLD DRAWN ROUND BARS AND TUBES



- DEPENDABLE SERVICE
- HIGH PRODUCTION
- QUALITY PERFORMANCE

This Sutton model shows the flexibility of the 5-roll principle illustrated at left. While normally only two of the five rolls are driven, this machine has four driven rolls to provide a burnishing action which polishes as it straightens.

*Ask for Bulletin No. 25*

SUTTON Engineering COMPANY

Manufacturers for Ferrous and Non-Ferrous Metal Industries

STRAIGHTENERS, EXTRUSION PRESSES, HYDRAULIC STRETCHERS, SHEET LEVELERS, CONTOUR CORRECTING MACHINES, STRAIGHTENING PRESSES, ROTARY CLEANERS, HEAVY-DUTY UNIVERSAL JOINTS, ROLLS

FIRST NATIONAL BANK BLDG., PITTSBURGH 22, PENNSYLVANIA
PHONE: GRANT 1-8077 PLANT: BELLEFONTE, PA.



trolled by a valve adjustment on the burner manifold. A variable speed drive on the turntable adjusts the heating time.

Flexible copper tubing makes it easy to adjust the nozzles. The manifold is adjustable both vertically and horizontally.

Commercial gas can be used. *Write*: Gas Appliance Service Inc., 1211 Webster Ave., Chicago 14, Ill. *Phone*: Diversey 8-5620

## Silver Solder

Two new alloys are for joining aluminum, copper, brass, bronze, stainless steel, steel, Monel and combinations of these and other metals.

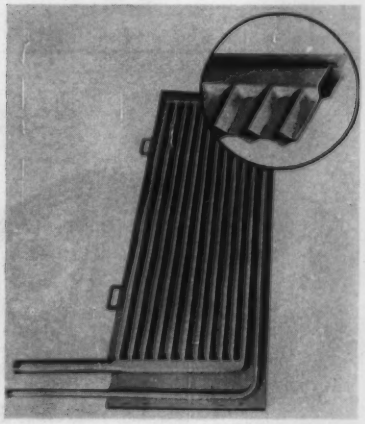
No. 105 medium temperature solder melts at 675° F and flows freely at 750° F. Its shear strength is 18,000 psi.

The other alloy, No. 107 general-purpose silver solder, melts at 450° F and flows freely at 600° F. It has excellent corrosion resistance and has a shear strength of 20,000 psi.

Both alloys are recommended for lap, sleeve and socket joints. Wire diameters are 1/16, 3/32 and 1/8-in. *Write*: All-State Welding Alloys Co. Inc., 249-55 Ferris Ave., White Plains, N. Y. *Phone*: White Plains 8-4646

## Heat Transfer Units

Embossed sheets of welded metal have pressure ratings of 150 lb. The safety factor is 1 to 4. The header-type, double-embossed units



were rated at 100 lb.

Other ratings: 70 lb for single-embossed, header-type units; 125 lb for single-embossed serpentine coils; 200 lb for double-embossed serpentine units. *Write*: Tranter Mfg. Inc., Lansing 4, Mich. *Phone*: Ivanhoe 4-4531

## Electric Welders

Two lines of arc welders operate from single-phase power. Current can be controlled at the welding position.

The SRAC series is for metallic arc welding. Models come in 200, 300 and 400-amp ratings, with or without power factor correction.

The SRTA series is for inert gas and inert gas spot welding. Models are 200 or 300 amp and are power factor corrected. Both lines are for alternating or direct current.

The SRH welders are a direct-current rectifier type that conserves floor space. They are horizontal rather than upright.

They have a single current range and come in three models with 60 per cent duty cycle ratings of 200, 300 and 400 amp. *Write*: Miller Electric Mfg. Co. Inc., Appleton, Wis. *Phone*: Regent 3-6621

## Brazing Flux

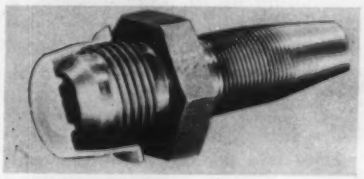
A high temperature flux meets the requirements for brazing of chrome and nickel alloys.

The flux is free flowing and active from 1400 to 2000° F. *Write*: Air Reduction Sales Co., division of Air Reduction Co. Inc., 60 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700

## Thread Protector

This polyethylene, transparent cap is self-sealing. It protects the threads and flare face of fittings during shipment.

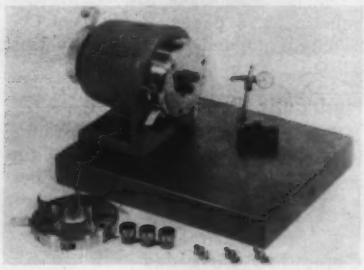
The plastic material is tough,



flexible, noncorrosive and impervious to all common chemicals and oils. The caps will fit over 5/16 to 1-1/16-in. fittings. They will fit comparable sizes in tubing. *Write*: Plastic Division, Clover Industries Inc., 269 Clover Bldg., Young St., Tonawanda, N. Y. *Phone*: Ludlow 1331

## Gaging Fixture

The shoulder squareness relative to the centerline of threads is checked by this gage.



Readily interchangeable roll holding plates and gaging rolls give an inspection range from ¼ to 1½-in. thread diameter.

Accuracy is about 0.0002-in. at 1½-in. diam. The fixture is used with an ordinary dial indicator.

The fixture consists of a gaging head mounted on a precision aligned spindle. Special thrust ball bearings insure squareness.

A hand crank rotates the spindle and head; errors in squareness are read easily on the indicator dial. *Write*: Pratt & Whitney Co. Inc., West Hartford 1, Conn. *Phone*: Adams 3-7561

## Lapping Machine

The exacting, figure-eight-motion hand lappers use to attain fine finishes is simulated by a lapping machine.

Where hand lappers work for long periods over lapping plates, stopping frequently to measure the finish, the machine does the job in a fraction of the time.

Optical flatness is obtained to 1 light band (0.0000116-in.).

A positive countermotion rotates parts to be lapped against the motion of the lapping plate for greater speed and accuracy. *Write*: Department PR31, Spitfire Tool Co., 2931 N. Pulaski Rd., Chicago 41, Ill. *Phone*: Palisade 5-1610

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52 Years making quality punches and dies. Our many customers throughout the nation repeat year after year because they know they can rely on our tools for consistent performance.
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# NEW literature

Write directly to the company for a copy

### Heat Exchangers

Performance data of convertors, instantaneous heaters and process equipment are presented by performance curves and examples. E. E. Cooley Co., 1186 Folsom St., San Francisco, Calif.

### Furnace Linings

Monolithic lining for industrial, foundry and steel mill furnaces is described in bulletin 69, 32 pages. Plibrico Co., 1800 Kingsbury St., Chicago 14, Ill.

### Carbide Tools

Here are suggestions on the selection of carbide tools. And a line of carbide tipped and solid carbide drills, reamers, end mills and counterbores is presented — 36 pages. Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, O.

### Furnaces and Generators

Electric and fuel-fired, heat-treating furnaces and atmosphere generators are described in a 17-page folder. Sargeant & Wilbur Inc., 180 Weeden St., Pawtucket, R. I.

### High-Speed Steels

Classification and symbols for identification of high-speed steels are given in a 32-page booklet. Le Vita Metal Alloy Co., 2980 W. Davison Ave., Detroit 38, Mich.

### Tungsten Carbide

Physical and chemical data on carbide grades for machining and die applications are given in a 4-page booklet. Dept. F-39, Adamas Carbide Corp., Kenilworth, N. J.

**Do you save money when you by-pass your distributor?**

See Page No. 20

### Industrial Clothing

Gloves and protective clothing are listed in a 12-page catalog. Industrial Products Division, B. F. Goodrich Co., Akron, O.

### Metal Hose

Flexible hose products and coupling data are presented in a 12-page booklet. Flexonics Corp., 1371 S. Third Ave., Maywood, Ill.

### Air Tools

Assembly tools, drills, grinders and other portable tools are described—bulletin 53, 8 pages. Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, O.

### Hydraulic Presses

Presses for bending, cogging, flanging, forming, straightening and upsetting are covered in a 4-page bulletin. R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa.

### Cemented Carbides

Four charts give properties of carbides, including wear resistance and hardness. Sales Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

### Wire Flattening Mills

Custom-engineered equipment for flattening ferrous, nonferrous and clad metal wire up to 1 in. in diameter is described—bulletin 731-R, 12 pages. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

### Testing Machines

Vertical and horizontal testing machines with capacities from 10,000 to 5 million lb are depicted—bulletin 4401, 12 pages. Testing Equipment Dept., Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

### Electric Cable

Here's a guide to the selection of insulated cable for many applications —bulletin 1096, 16 pages. Okonite Co., Passaic, N. J.

### Surface Grinders

Precision grinders for toolroom and production grinding are described in a 24-page bulletin. DoAll Co., Des Plaines, Ill.

### Gage Blocks

Linear and angular gage blocks and accessories, optical flats and temperature meters are covered—bulletin 56, 36 pages. Webber Gage Co., 12912 Triskett Rd., Cleveland 11, O.

### Air Cylinders

Cylinders with interchangeable mountings are depicted in a 12-page bulletin. Petch Mfg. Co., 463 York, Detroit 2, Mich.

### Double-Faced Tapes

A 4-page bulletin gives technical data and uses of industrial tapes. Advertising Services Department, Permacel Tape Corp., New Brunswick, N. J.

### Compression Spring

Here are design data on a spring that exerts the same force at any deflection—bulletin 313A-1-55, 16 pages. Flex'ator Division, Hunter Spring Co., Lansdale, Pa.

### Tool Catalog

Screw drivers, nut drivers, pliers, plastic mallets and specialty tools are presented—catalog SD-56, 40 pages. Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill.

### Steel Piping

The manufacture of steel pipe and its advantages are described in a 32-page booklet. Steel Plate Fabricators Association, 79 W. Monroe St., Chicago 3, Ill.

### Diecasting Machines

A line of diecasting machines is presented; charts indicate capacities for both zinc and aluminum. Dept. N-2, Lester Phoenix Inc., 2711 Church Ave., Cleveland, O.

### Abrasive Separation

Separators that handle from 33,000 to 320,000 lb of blast cleaning abrasive in an hour are described in bulletin 1003, 8 pages. Pangborn Corp., Hagerstown, Md.

### Hardness Conversion Table

A pocket-size celluloid card gives the approximate relationship between Brinell, Vickers, Rockwell and Shore Scleroscope hardness values and tensile strength. International Nickel Co. Inc., 67 Wall St., New York 5, N. Y.

### Pressure Pipe

Carbon, nickel and stainless tubular products for subzero temperature uses are specified—bulletin TB-357, 6 pages. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

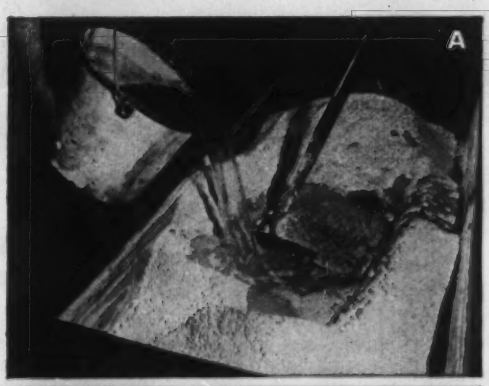
### Electric Motors

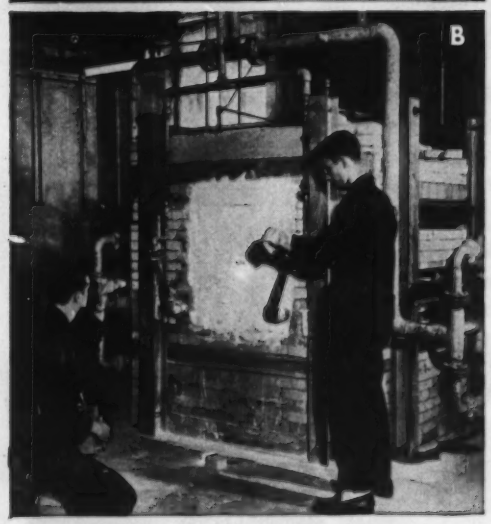
Motors built to the new NEMA standards (open drip-proof, enclosed and explosion proof) are presented in bulletin 1700. Louis Allis Co., Milwaukee 7, Wis.

### Tube Mills

Here is a description of the cold-forming, electric-weld process for making tube—64 pages. Yoder Co., Cleveland 2, O.

# NEW B&W 3200 degree Refractory Concrete




Today, in some types of heating and melting furnaces, complete linings or sections of linings are subjected to temperatures over 3000 F and, with the trend to higher and higher operating temperatures, the problem of finding the most economical refractories for this "over 3000 F service" will become even more important.

Now, with B&W's new Refractory Castable-3200, furnace builders and operators can cut installation costs by using castable construction for services up to 3200 F. As easy to use as other B&W refractory concretes, B&W Refractory Castable-3200 can be poured or trowelled into place or applied with a cement gun.

Several years ago, B&W developed Kaocast, the first successful 3000 degree refractory concrete, to lead this high temperature castable trend. B&W Castable-3200, like Kaocast, is made with an alumina-silica base and is recommended for temperatures from 2600 to 3200 F. Because of its very high temperature properties, it is not recommended for temperatures below 2600 F.

If you have not taken advantage of the fast, low cost installation of castables for your high temperature requirements, we suggest you investigate B&W Kaocast and the new B&W Castable-3200. Your local B&W Refractories Engineer has all the facts.

**A** Mixed like structural concrete, B&W Refractory Castable-3200 can be poured, trowelled or gunned into place. • **B** High temperature laboratory furnace lined with B&W Refractory Castable-3200.

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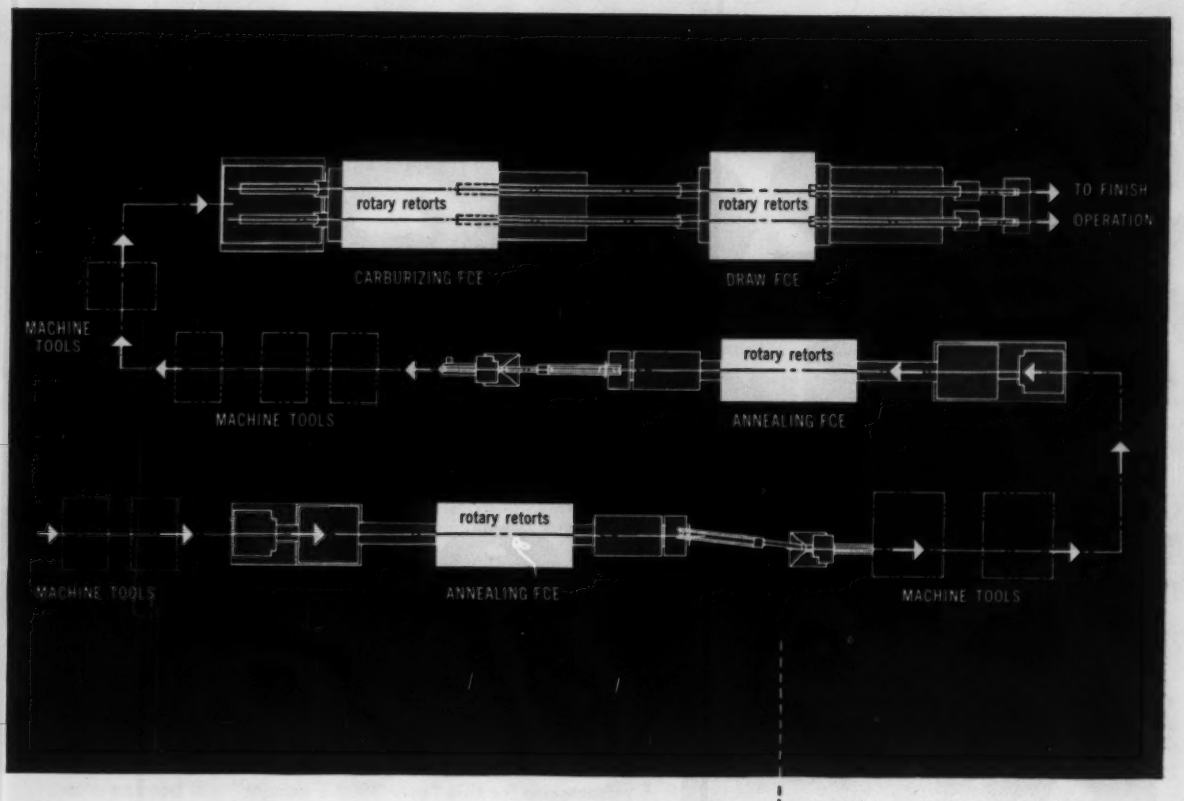



# 'Surface' lines 'em up furnaces, machines, costs

There's more than one way to automate furnaces for high production, lower costs, and uniform quality—and 'Surface' engineers can show you a good many of them.

Dana Corporation, Marion Division, is a good illustration of the range of 'Surface' automation available. There you can see (1) different furnaces linked with machines at separate points on the line, (2) a self-contained automatic heat treat line within the production line, and (3) single furnace units with work handling completely automatic within each furnace.

Each of these types of automation results in higher production, more uniform quality, and lower handling costs than can be achieved in the conventional, isolated heat treat department. The point to remember is that these advantages aren't limited to high production plants; they can be applied to smaller operations as well. The sooner you apply them, the sooner they will pay off for you.

**Write for the Heat Treat automation story today, Bulletin H55-11**

Surface
HEAT TREATING EQUIPMENT

**SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO**
Also makers of Janitrol automatic space heating and Kathabar humidity conditioning units

# Market Outlook

CONSUMERS' hopes for easier steel supply by the second quarter are encouraged by a slight dip in automotive requirements.

But they shouldn't count their chicks before they're hatched. Tonnage will not be much freer for several months. Auto builders are not likely to cut their mill order load sharply until the threat of a steel strike is removed—that means midyear at earliest. Further, there is such an excess of demand in the market that any slack will be quickly taken up.

**LESS CONVERSION—** Most market people agree the only reflections of automotive cutbacks in the steel market so far are in decreased conversion deals and orders at premium prices.

Buyers are interested in seeing how far the readjustments will spread. They want to know if products other than sheets, strip and bars will be affected. Plates and structurals are in extremely tight supply. An easing in demand for the lighter steel items should permit diversion of semifinished to production of the heavier products. Until that happens there is little chance for any real easing in over-all steel supply.

**TIGHT FIRST HALF—**Most buyers can come to only one conclusion: While they may get a little more steel than they expected in the first and second quarters, over-all supply will continue tight throughout the first half.

All indications point to continued heavy consumption. There will be large requirements for railroad equipment, line pipe, the oil and chemical industries, building and road construction and heavy industrial and electrical facilities. In addition to construction, various consuming lines, such as canmaking and agriculture, will be stimulated seasonally. Auto production will get into high gear shortly.

**INVENTORIES SHORT—**Consumers' stocks, even by normal standards, are critically short. They need building up. Prospects for higher prices over coming months are bound to stimulate stock expansion. The possibility of a steel strike around midyear is certain to generate more protective covering than usual.

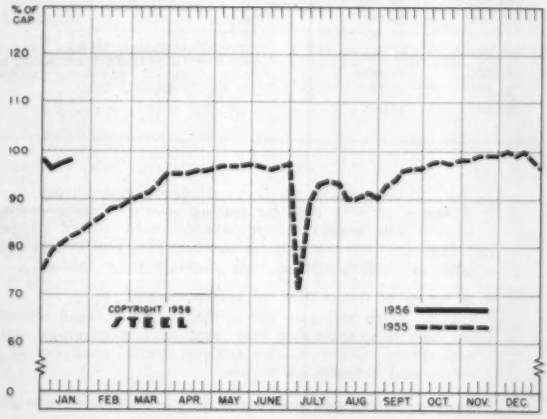
Some large steelmakers indicate they will start opening their second quarter order books late this month, or early in February.

**SCRAP WATCHED—**The sensational rise in scrap at Youngstown recently (No. 1 grades hit $62 per ton on sales of production material to several mills) has caused considerable market uncertainty. Market forces are making a determined effort to prevent a runaway situation. In any case, prices in other areas have not been affected.

**OPERATIONS—** Reflecting strong demand and producers' efforts to get supply in balance with consumption as quickly as possible, the national ingot rate advanced 1 point last week to 98 per cent of capacity. A further rise is expected. A record-breaking total of 117,000,566 net tons of steel were produced in this country last year.

**PRICES—** Reflecting recent changes in such products as buttweld pipe and manufacturers bright wire, STEEL's arithmetical price composite on finished steel has advanced to $128 from $127.60.

## NATIONAL STEELWORKS OPERATIONS




## DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

| | Week Ended Jan. 15 | Change | Same Week 1955 | Same Week 1954 |
|---|---|---|---|---|
| Pittsburgh | 100.5 | + 2.5 | 80 | 86 |
| Chicago | 97 | — 2* | 84 | 78.5 |
| Mid-Atlantic | 96 | 0 | 76 | 82 |
| Youngstown | 98 | — 2 | 86 | 78 |
| Wheeling | 97.5 | — 1 | 94.5 | 82 |
| Cleveland | 98 | + 1.5 | 96 | 88 |
| Buffalo | 105 | 0 | 100 | 65 |
| Birmingham | 95.5 | + 2 | 74 | 95 |
| New England | 94 | + 2 | 75 | 67 |
| Cincinnati | 86.5 | — 2 | 83.5 | 69 |
| St. Louis | 99.5 | + 0.5 | 78 | 67 |
| Detroit | 105 | + 5 | 88 | 86.5 |
| Western | 103 | 0 | 76 | 77 |
| National Rate | 98 | + 1 | 82 | 74.5 |

## INGOT PRODUCTION‡

| | Week Ended Jan. 15 | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| INDEX (1947-1949=100) | 148.7† | 149.6 | 150.7 | 124.9 |
| NET TONS (In thousands) | 2,388† | 2,403 | 2,421 | 2,007 |

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 31

Technical Outlook—p. 67

# Price Indexes and Composites

## FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

| | Jan. 10 1956 | Jan. 3 1956 | Month Ago | Dec. Average |
|---|---|---|---|---|
| (1947-1949=100) | 155.7 | 155.7 | 154.8 | 154.8 |

## AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

| | | | |
|---|---|---|---|
| Rails, Standard, No. 1 | $4.800 | Sheets, Electrical | $10.175 |
| Rails, Light, 40 lb | 6.217 | Strip, C.R., Carbon | 8.293 |
| Tie Plates | 5.625 | Strip, C.R., Stainless, 403 (lb) | 0.444 |
| Axles, Railway | 8.000 | Strip, H.R., Carbon | 5.406 |
| Wheels, Freight Car, 33 in. (per wheel) | 52.50 | Pipe, Black, Buttweld (100 ft) | 16.997 |
| Plates, Carbon | 4.950 | Pipe, Galv., Buttweld (100 ft) | 20.930 |
| Structural Shapes | 4.867 | Pipe, Line (100 ft) | 167.167 |
| Bars, Tool Steel, Carbon (lb) | 0.460 | Casing, Oil Well, Carbon (100 ft) | 165.120 |
| Bars, Tool Steel Alloy, Oil Hardening Die (lb) | 0.560 | Casing, Oil Well, Alloy (100 ft) | 244.670 |
| Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb) | 1.185 | Tubes, Boiler (100 ft) | 39.470 |
| Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4 V 1 (lb) | 1.680 | Tubing, Mechanical, Carbon | 20.980 |
| Bars, H.R., Alloy | 9.413 | Tubing, Mechanical, Stainless, 304 (100 ft) | 178.897 |
| Bars, H.R., Stainless, 303 (lb) | 0.450 | Tin Plate, Hot-dipped, 1.25 lb | 8.933 |
| Bars, H.R., Carbon | 5.50 | Tin Plate, Electrolytic, 0.25 lb | 7.633 |
| Bars, Reinforcing | 5.313 | Black Plate, Canmaking Quality | 6.733 |
| Bars, C.F., Carbon | 8.690 | Wire, Drawn, Carbon | 8.575 |
| Bars, C.F., Alloy | 12.175 | Wire, Drawn, Stainless 430 (lb) | 0.578 |
| Bars, C.F., Stainless, 302 (lb) | 0.469 | Bale ties (bundle) | 6.473 |
| Sheets, H.R., Carbon | 5.145 | Nails, Wire, 8d Common | 8.595 |
| Sheets, C.R., Carbon | 6.214 | Wire, Barbed (80-rod spool) | 7.847 |
| Sheets, Galvanized | 7.770 | Woven Wire Fence (20-rod roll) | 18.635 |
| Sheets, C.R., Stainless, 302 (lb) | 0.588 | | |

## STEEL's FINISHED STEEL PRICE INDEX*

| | Jan. 11 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Index (1935-39 av.=100) | 209.10 | 209.10 | 208.90 | 194.53 | 171.92 |
| Index in cents per lb | 5.665 | 5.665 | 5.659 | 5.270 | 4.657 |

## STEEL's ARITHMETICAL PRICE COMPOSITES

| | | | | | |
|---|---|---|---|---|---|
| Finished Steel, NT* | $128.00 | $128.00 | $127.68 | $117.95 | $105.55 |
| No. 2 Fdry, Pig Iron, GT | 58.99 | 58.99 | 58.99 | 56.54 | 52.54 |
| Basic Pig Iron, GT | 58.49 | 58.49 | 58.49 | 56.04 | 52.16 |
| Malleable Pig Iron, GT | 59.77 | 59.77 | 59.77 | 57.27 | 53.27 |
| Steelmaking Scrap, GT | 53.33 | 52.17 | 50.17 | 35.00 | 45.50 |

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.
†Revised.

# Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

| FINISHED STEEL | Jan. 11 1956 | Week Ago | Month Ago | Year Ago | 5 Yrs. Ago |
|---|---|---|---|---|---|
| Bars, H.R., Pittsburgh | 4.65 | 4.65 | 4.65 | 4.30 | 3.70 |
| Bars, H.R., Chicago | 4.65 | 4.65 | 4.65 | 4.30 | 3.70 |
| Bars, H.R., deld. Philadelphia | 4.90 | 4.90 | 4.90 | 4.55 | 4.15 |
| Bars, C.F., Pittsburgh | 5.90 | 5.90 | 5.90 | 5.40 | 4.55 |
| Shapes, Std., Pittsburgh | 4.60 | 4.60 | 4.60 | 4.25 | 3.65 |
| Shapes, Std., Chicago | 4.60 | 4.60 | 4.60 | 4.25 | 3.65 |
| Shapes, deld., Philadelphia | 4.88 | 4.88 | 4.88 | 4.53 | 3.90 |
| Plates, Pittsburgh | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Chicago | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Coatesville, Pa. | 4.80 | 4.80 | 4.80 | 4.225 | 4.15 |
| Plates, Sparrows Point, Md. | 4.50 | 4.50 | 4.50 | 4.225 | 3.70 |
| Plates, Claymont, Del. | 4.80 | 4.80 | 4.80 | 4.225 | 4.15 |
| Sheets, H.R., Pittsburgh | 4.325 | 4.325 | 4.325 | 4.05 | 3.60-3.75 |
| Sheets, H.R., Chicago | 4.325 | 4.325 | 4.325 | 4.05 | 3.60 |
| Sheets, C.R., Pittsburgh | 5.325 | 5.325 | 5.325 | 4.95 | 4.35 |
| Sheets, C.R., Chicago | 5.325 | 5.325 | 5.325 | 4.95 | 4.35 |
| Sheets, C.R., Detroit | 5.325-5.425 | 5.325-5.425 | 5.325-5.425 | 5.10 | 4.55 |
| Sheets, Galv., Pittsburgh | 5.85 | 5.85 | 5.85 | 5.45 | 4.80 |
| Strip, H.R., Pittsburgh | 4.325 | 4.325 | 4.325 | 4.05 | 3.75-4.00 |
| Strip, H.R., Chicago | 4.325 | 4.325 | 4.325 | 4.05 | 3.50 |
| Strip, C.R., Pittsburgh | 6.25 | 6.25 | 6.25 | 5.75 | 4.65-5.35 |
| Strip, C.R., Chicago | 6.25-6.35 | 6.25-6.35 | 6.35 | 5.85 | 4.50-4.90 |
| Strip, C.R., Detroit | 6.35 | 6.35 | 6.35 | 5.90 | 4.35-5.60 |
| Wire, Basic, Pittsburgh | 6.60 | 6.60 | 6.25 | 5.75 | 4.85-5.10 |
| Nails, Wire, Pittsburgh | 7.60 | 7.60 | 7.60 | 6.85 | 5.90-6.20 |
| Tin plate (1.50 lb), box, Pitts. | $9.45 | $9.45 | $9.45 | $9.05 | $8.70 |
| **SEMIFINISHED STEEL** | | | | | |
| Billets, Forging, Pitts. (NT) | $84.50 | $84.50 | $84.50 | $78.00 | $66.00 |
| Wire rods, 7/32-½" Pitts. | 5.025 | 5.025 | 5.025 | 4.675 | 4.10-4.30 |
| **PIG IRON, Gross Ton** | | | | | |
| Bessemer, Pitts. | $59.50 | $59.50 | $59.50 | $57.00 | $53.00 |
| Basic, Valley | 58.50 | 58.50 | 58.50 | 56.00 | 52.00 |
| Basic, deld. Phila. | 62.16 | 62.16 | 62.16 | 59.66 | 56.39 |
| No. 2 Fdry, Pitts. | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| No. 2 Fdry, Chicago | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| No. 2 Fdry, Valley | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| No. 2 Fdry, deld. Phila. | 62.66 | 62.66 | 62.66 | 55.16 | 56.89 |
| No. 2 Fdry, Birm. | 55.00 | 55.00 | 55.00 | 52.88 | 48.88 |
| No. 2 Fdry (Birm.) deld. Cin. | 62.70 | 62.70 | 62.70 | 60.58 | 55.58 |
| Malleable, Valley | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| Malleable, Chicago | 59.00 | 59.00 | 59.00 | 56.50 | 52.50 |
| Ferromanganese, Duquesne | 205.00† | 205.00† | 190.00† | 190.00† | 188.00* |

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

## SCRAP, Gross Ton (Including broker's commission)

| | | | | | |
|---|---|---|---|---|---|
| No. 1 Heavy Melt, Pitts. | $54.50 | $51.00 | $50.00 | $36.50 | $46.50 |
| No. 1 Heavy Melt, E. Pa. | 55.00 | 55.00 | 50.00 | 33.50 | 45.00 |
| No. 1 Heavy Melt, Chicago | 50.50 | 50.50 | 50.50 | 35.00 | 45.00 |
| No. 1 Heavy Melt, Valley | 58.50 | 57.50 | 52.50 | 36.50 | 46.25 |
| No. 1 Heavy Melt, Cleve. | 54.50 | 54.50 | 50.50 | 33.50 | 45.75 |
| No. 1 Heavy Melt, Buffalo | 47.50 | 45.50 | 45.50 | 30.50 | 44.88 |
| Rails, Rerolling, Chicago | 72.50 | 72.50 | 73.50 | 53.00 | 67.00 |
| No. 1 Cast, Chicago | 51.50 | 51.50 | 50.50 | 40.00 | 62.00 |
| **COKE, Net Ton** | | | | | |
| Beehive, Furn, Connlsvl. | $14.125 | $14.125 | $13.625 | $13.75 | $14.75 |
| Beehive, Fdry, Connlsvl. | 16.50 | 16.50 | 16.50 | 16.75 | 17.50 |
| Oven, Fdry, Chicago | 27.00 | 27.00 | 25.75 | 24.50 | 21.00 |

# Daily Nonferrous Price Record

| | Price Jan. 11 | Last Change | Previous Price | Dec. Avg. | Nov. Avg. | Jan. 1955 Avg. |
|---|---|---|---|---|---|---|
| Copper | 43.00-50.25 | Dec. 29, 1955 | 43.00-50.00 | 46.053 | 44.420 | 30.180 |
| Lead | 16.30 | Jan. 4, 1956 | 15.80 | 15.358 | 15.300 | 14.800 |
| Zinc | 13.50 | Jan. 6, 1956 | 13.00 | 13.000 | 13.000 | 11.500 |
| Tin | 106.375 | Jan. 11, 1956 | 106.625 | 107.98 | 97.825 | 87.280 |
| Nickel | 64.50 | Nov. 24, 1954 | 60.00 | 64.500 | 64.500 | 64.500 |
| Aluminum | 24.40 | Aug. 8, 1955 | 23.20-24.40 | 24.400 | 24.400 | 22.900 |
| Magnesium | 32.50 | Aug. 16, 1955 | 28.50 | 32.500 | 32.500 | 27.000 |

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

## What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

# FIELD REPORT: NO. 90

## WHICH DIE STEEL WOULD YOU USE HERE to get this punch out of hardening in one piece?

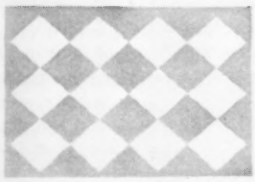
This punch blanks automotive stampings from SAE 1010 strip, .062" thick. It is so unbalanced in design that safety in hardening is vital in the die steel used. Since the punch is shear fitted to the die section before heat treating, accuracy in hardening is equally important. The punch is hardened to Rockwell C-61/62. All the steels tried either broke or changed size excessively.

If the decision were squarely in your lap, which die steel would you be willing to recommend?

Here's how the manufacturer solved the problem, as recorded in a Field Report from our customer: The Carpenter Matched Set Method showed that Carpenter VEGA (Air-Tough) Die Steel had the hardening safety and accuracy plus toughness demanded by the job. The punches are now coming through heat treatment "right on the nose," and production between grinds has jumped from about 10,000 to 50,000 parts. Further, the heat treater says VEGA is the easiest air-hardening steel he has ever worked with.

When the decision is up to you, rely on Carpenter for *dependable* results. For fast attention to your orders, call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor, today. *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

**Your toolroom can use Carpenter Matched Tool and Die Steels to:**



Reduce hardening hazards
Minimize machine downtime
Boost output per grind
Improve product quality

**Carpenter STEEL**

**Matched Tool and Die Steels**

*IMMEDIATE DELIVERY from local warehouse stocks — Export Address: Port Washington, N. Y. — "CARSTEELCO"*

# Nonferrous Metals

**Price rises are taken philosophically by industry as lead and zinc markets remain firm. One cloud on the horizon: Automakers are cutting back some orders**

Nonferrous Metal Prices, Pages 110 & 111

LEAD AND ZINC continue to enjoy high level demand. The price hikes (lead to 16.50 cents a pound, zinc to 13.50) have been noted by industry, but there is little change in most metal buyers' attitudes except to approach the placing of advance orders with some caution.

**Lead**—One leading lead producer told STEEL: "The price hikes are not scaring away customers. We are booked solidly through January . . . We actually have turned down an order or two." Other lead men report that February sales are slow, but quickly point out that January is booked solidly. Crux: Most producers are experiencing sales which will keep the lead market firm at its present level. Buyers will order heavily for current needs but will tend to ignore future requirements.

**Zinc**—In October, an attempt to raise the price to 13.50 cents a pound ran into a stone wall of resistance. But when the London market went above the parity price of domestic zinc, there was no choice. After watching lead rise 1 cent a pound in a few days, domestic zinc producers made the move on Jan. 6. While there is no real shortage of zinc in this country, domestic users are partially dependent on foreign supplies, and the high London price soon would have diverted shipments from the U. S. into the European market.

Some observers are wondering if the General Services Administration will enter the market to buy lead and zinc for stockpile at the combined price of 30 cents a pound. There is a growing feeling that so long as the government eventually must stop buying for long-range stockpile, now would be a good time to do it. Reason: The '56 outlook for lead and zinc indicates that high level demand will continue.

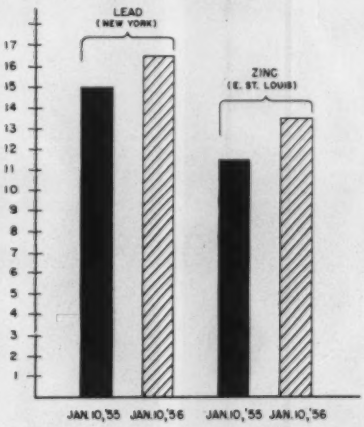
**Cause For Concern**—There may be a weak spot. Automakers are cutting back some orders. A successful year for lead and zinc is tied closely to car production.

## Nickel Production Climbs

"Free world nickel production is estimated at 442 million lb for 1956," says John F. Thompson, chairman, International Nickel Co. of Canada. This will be an increase of some 15 million lb over last year's estimated production of 427 million lb. Last December's forecasts estimated that free world nickel production for '55 would be only about 400 million lb.

### A Year of Price Increases

(Cents Per Pound)




Even with better than expected production last year, and increased nickel production slated for this year, there is still a long way to go before supply catches up with demand.

The Office of Defense Mobilization will conduct a thorough survey of the situation. Arthur S. Flemming, ODM director, has appointed John R. Townsend, director of materials and standard engineering, Sandia Corp., to study: 1. The current and prospective nickel supply. 2. What impact defense requirements are having on the civilian market. Mr. Townsend will delve into atomic energy and set-aside requirements, too. Hoped-for solution: Find a way to satisfy the cravings of the stockpile, military, atomic energy and civilian markets for nickel.

Food for thought: Will Mr. Townsend's report recommend that the U. S. or private industry get busy and build smelting and refining facilities at the U. S. Nicaro mines?

## Good Year for Brass

Herman W. Steinkraus, chairman and president, Bridgeport Brass Co., reports: "We look forward to the current year with confidence that it has the potentiality of being the best in our 90-year history."

Mr. Steinkraus points to a stabilized economy and record employment as good omens. "Our economy," he explains, "is not based on a combination of heavy military expenditures, fear, inflation or high inventory accumulation." The only "if" to its best-year drive: Bridgeport will need a stable copper market and increased quantities of copper and aluminum to permit a higher rate of production for its mill products.

## Chilean Copper Strike Wanes

The Chilean copper strike called on Dec. 14 appears to be over. Reports from Chile were complicated last week as a general strike, protesting the government's move to curb inflation, was called about the time miners decided to go back to work. Anaconda miners returned on Jan. 6. Kennecott's miners waited a few more days and started to report back last week end. By Jan. 9 about 60 per cent of all workers were back. The general strike, which could tie up rail and dock facilities, is under control, says the Chilean government. Chile is under a mild form of martial law, and there are indications that the road to normal copper production may have a few more bumps in the offing.

## Market Memos

- Tin prices appear to be heading for a gentle decline. Many dealers would prefer to see the price at the 96-to-97-cent-a-pound level. But, they point out, tin prices are affected by political tensions from the Suez canal to Malaya.
- Aluminum had its second best month of 1955 in November, says the Aluminum Association. Primary production in November reached 267,377,623 lb, a gain of 24.8 million lb over the same month in 1954. The record month was October, when 269.3 million lb were produced.
- Rumor of the week: The price of nickel is going up.
- Zinc production in December reached an all-time high of 92,578 tons. Total shipments were 89,657, which resulted in an increase in stocks of slab zinc at the smelters to 40,979 tons. Even at that, stocks of prime western represent less than one month's supply, those of special high grade, a week's.

(Top) Heating a wide face shaft pinion for hardening with Selas Duradiant burners at Baldwin-Lima-Hamilton. (Lower) Narrow face gear being heated by Selas Superheat burners at Wiedemann Machine Co.

# FUEL COST 11.4c

# PER 52-POUND GEAR *with Selas Heat Processing*

For hardening gears, pinions, segments, rollers, rings, shafts, cylinders, wheels and cams, Selas heat processing methods are unequalled for economy, speed and versatility. With equipment as shown above, for example, 52-lb. spur gears, with 24″ pitch diameter and 1½″ face, are tooth-hardened at a rate of 10 per hour, with a fuel cost of only 11.4c each.

Selas heating, using regularly-supplied fuels (manufactured gas, natural gas or propane), premixed with air . . . permits precise localized heating . . . to develop full surface hardness and controlled depth of hardness. The operation can be fully automatic.

Bottled oxygen is not required.

In heat treating, brazing, forging, strip annealing, and other continuous operations involving both ferrous and nonferrous metals, Selas Engineers can design heat processing equipment to help speed production, improve product quality and reduce manufacturing costs.

*Write for descriptive data concerning your heating requirements.*

SELAS

**SELAS CORPORATION OF AMERICA**
**PHILADELPHIA 34, PA.**

# Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

## PRIMARY METALS AND ALLOYS

**Aluminum:** 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

**Aluminum Alloy:** No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

**Antimony:** R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

**Beryllium:** 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

**Beryllium Aluminum:** 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

**Beryllium Copper:** 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

**Bismuth:** $2.25 per lb ton lots.

**Cadmium:** Sticks and bars $1.70 per lb, deld.

**Cobalt:** 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

**Columbium:** Powder, $119.20 per lb, nom.

**Copper:** Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest: custom smelters, 50.00-50.25 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

**Germanium:** 99.9%, $295 per lb, nom.

**Gold:** U. S. Treasury, $35 per oz.

**Indium:** 99.9%, $2.25 per troy oz.

**Iridium:** $100-$120 nom, per troy oz.

**Lead:** Common, 16.30, chemical, 16.40, corroding, 16.40, St. Louis, New York basis, add 0.20.

**Lithium:** 99% +, cups or ingot, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

**Magnesium:** 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

**Magnesium Alloys:** AZ91C and alloys C, G, H and R, 36.00; AZ91B, 31.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

**Mercury:** Open market, spot, New York, $280-$284 per 76-lb flask.

**Molybdenum:** Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

**Nickel:** Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

**Osmium:** $80-$100, nom, per troy oz.

**Palladium:** $22-$24 per troy oz.

**Platinum:** $97-$117 per troy oz from refineries.

**Radium:** $16-$21.50 per mg radium content, depending on quantity.

**Rhodium:** $118-$125 per troy oz.

**Ruthenium:** $45-$55 per troy oz.

**Selenium:** 99.5%, $9-$10 per lb.

**Silver:** Open market, 90.50 per troy oz.

**Sodium:** 16.50, c.l.; 17.00 l.c.l.

**Tantalum:** Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

**Tellurium:** $1.75 per lb.

**Thallium:** $12.50 per lb.

**Tin:** Straits, N. Y., spot, 106.375; prompt, 106.125.

**Titanium:** Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

**Tungsten:** Powder, 98.8%, carbon reduced, 1000-lb lots, $4.30 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced $4.85. Treated ingot, $6.70.

**Zinc:** Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade 15.25, deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

**Zirconium:** Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

## SECONDARY METALS AND ALLOYS

**Aluminum Ingot:** Piston alloys, 33.00-34.75; No. 12 foundry alloy (No. 2 grade) 32.00-32.25; 5% silicon alloy, 0.60 Cu max, 33.50-33.75; 13 alloy, 0.60 Cu max, 33.50-33.75; 195 alloy, 33.50-33.75; 108 alloy 32.00. Steel deoxidizing grades notch bars, granulated or shot: Grade 1, 31.50-32.75; grade 2, 30.50-31.75; grade 3, 30.00-31.00; grade 4, 29.25-30.50.

**Brass Ingot:** Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

**Magnesium Alloy Ingot:** AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

## NONFERROUS MILL PRODUCTS

### BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

### COPPER WIRE

**Bare, soft,** f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

### LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $22.00 per cwt; pipe, full coils, $22.00 per cwt; traps and bends, list prices plus 30%.

### TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

### ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00-24.00; ribbon zinc in coils, 20.50-21.50; plates 19.50-22.25.

### ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

### NICKEL MONEL, INCONEL

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheets, C.R. | 102 | 83 | 99 |
| Strip, C.R. | 102 | 92 | 125 |
| Plate, H.R. | 97 | 87 | 95 |
| Rod, Shapes, H.R. | 87 | 74 | 93 |
| Seamless Tubes | 122 | 110 | 153 |
| Shot, Blocks | ... | 71 | ... |

### ALUMINUM

**Screw Machine Stock:** 30,000 lb base.

| Diam. (in.) or across flats | Round 2011-T3 | Round 2017-T4 | Hexagonal 2011-T3 | Hexagonal 2017-T4 |
|---|---|---|---|---|
| **Drawn** | | | | |
| 0.125 | 67.9 | 66.4 | ... | ... |
| 0.156-0.172 | 57.5 | 55.9 | ... | ... |
| 0.188 | 57.5 | 55.9 | ... | 71.7 |
| 0.219-0.234 | 54.5 | 52.9 | ... | ... |
| 0.250-0.281 | 54.5 | 52.9 | ... | 68.4 |
| 0.313 | 54.5 | 52.9 | ... | 65.2 |
| **Cold-finished** | | | | |
| 0.375-0.547 | 53.4 | 51.4 | 63.7 | 61.3 |
| 0.563-0.688 | 53.4 | 51.4 | 60.6 | 57.5 |
| 0.750-1.000 | 52.1 | 50.1 | 55.4 | 54.2 |
| 1.063 | 52.1 | 50.1 | ... | 52.3 |
| 1.125-1.500 | 50.1 | 48.2 | 53.6 | 52.3 |
| **Rolled** | | | | |
| 1.563 | 48.8 | 46.9 | ... | ... |
| 1.625-2.000 | 48.2 | 46.2 | ... | 50.5 |
| 2.125-2.500 | 47.0 | 45.0 | ... | ... |
| 2.563-3.375 | 45.6 | 43.6 | ... | ... |

### ALUMINUM

**Sheet and Circles:** 1100 and 3003 mill finish (30,000 lb base; freight allowed)

| Thickness Range Inches | Flat Sheet | Flat Sheet Circles* | Coiled Sheet | Coiled Sheet Circle† |
|---|---|---|---|---|
| 0.249-0.136 | 37.5 | 42.3 | ... | ... |
| 0.135-0.096 | 38.0 | 43.2 | ... | ... |
| 0.095-0.077 | 38.7 | 44.2 | 36.1 | 41.3 |
| 0.076-0.061 | 39.3 | 45.1 | 36.3 | 41.5 |
| 0.060-0.048 | 39.9 | 45.6 | 36.7 | 42.0 |
| 0.047-0.038 | 40.4 | 46.5 | 37.2 | 42.4 |
| 0.037-0.030 | 40.8 | 47.0 | 37.6 | 43.1 |
| 0.029-0.024 | 41.4 | 47.5 | 37.9 | 43.6 |
| 0.023-0.019 | 42.2 | 49.0 | 38.8 | 44.5 |
| 0.018-0.017 | 43.0 | ... | 39.4 | 45.4 |
| 0.016-0.015 | 43.9 | ... | 40.2 | 46.6 |
| 0.014 | 44.9 | ... | 41.2 | 47.9 |
| 0.013-0.012 | 46.1 | ... | 41.9 | 48.9 |
| 0.011 | 47.1 | ... | 43.1 | 50.5 |
| 0.010-0.0095 | 48.4 | ... | 44.3 | 52.2 |
| 0.009-0.0085 | 49.7 | ... | 45.8 | 54.3 |
| 0.008-0.0075 | 51.3 | ... | 47.0 | 56.1 |
| 0.007 | 52.8 | ... | 48.5 | 58.4 |
| 0.006 | 54.4 | ... | 49.9 | 63.4 |

*48 in. max diam. †26 in. max diam.

### ALUMINUM

**Plates and Circles:** Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

| Alloy | Plate Base | Circle Base |
|---|---|---|
| 1100-F, 3003-F | 36.5 | 40.8 |
| 5050-F | 37.6 | 41.9 |
| 3004-F | 38.6 | 43.8 |
| 5052-F | 39.9 | 45.2 |
| 6061-T6 | 41.1 | 46.0 |
| 2024-T4* | 43.6 | 49.9 |
| 7075-T6* | 51.4 | 58.5 |

*24-48 in. widths or diam, 72-180 lengths.

### ALUMINUM

**Forging Stock:** Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

**Pipe:** ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

| Nom. Pipe Size (in.) | | Nom. Pipe Size (in.) | |
|---|---|---|---|
| ⅜ | $16.85 | 2 | $ 51.90 |
| 1 | 26.50 | 4 | 143.00 |
| 1¼ | 35.85 | 6 | 256.70 |
| 1½ | 42.90 | 8 | 386.30 |

### MAGNESIUM

**Sheet:** AZ31, commercial grade, 0.032 in., 99.00; 0.064 in., 78.00; 0.125 in., 63.50, 30,000 lb and over, f.o.b. mill.

**Plate:** AZ31, 61.00, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in., tread plate, 64.00, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

**Extrusions:** AZ31 commercial grade, rectangels, ⅛ x 2 in., 64.70; 1 x 4 in., 69.50. Rod, 1 in., 61.50; 2 in., 59.00. Tubing, 1 in. OD x 0.065 in., 82.50. Angles, 1 x 1 x ⅛-in., 68.40; 2 x 2 x ¼-in., 62.50. Channels, 5 in., 63.40. I-beams, 5 in., 62.70.

## NONFERROUS SCRAP

### DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

**Aluminum:** 1100 clippings, 20.00-20.50; old sheets 17.00-17.50; borings and turnings, 11.50-12.00; crankcases, 17.00-17.50; industrial castings 17.00-17.50.

**Copper and Brass:** No. 1 heavy copper and wire 41.50-42.00; No. 2 heavy copper and wire, 37.50-38.50; light copper, 35.50-36.00; No. 1 composition red brass 32.00-32.50; No. 1 composition turnings, 31.00-31.50; yellow

## BRASS MILL PRICES

| | MILL PRODUCTS a | | | | SCRAP ALLOWANCES f | | |
|---|---|---|---|---|---|---|---|
| | Sheet, Strip, Plate | Rod | Wire | Seamless Tube | Clean Heavy | Rod Ends | Clean Turnings |
| Copper | 63.13b | 60.36c | .... | 63.32 | 39.000 | 39.000 | 38.250 |
| Yellow Brass | 52.27 | 42.41d | 52.81 | 55.18 | 28.875 | 28.625 | 26.750 |
| Red Brass, 85% | 58.09 | 58.03 | 58.63 | 60.90 | 34.250 | 34.000 | 33.500 |
| Low Brass, 80% | 56.55 | 56.49 | 57.09 | 59.36 | 32.750 | 32.500 | 32.000 |
| Naval Brass | 55.63 | 49.94 | 62.69 | 58.79 | 26.750 | 26.500 | 26.000 |
| Com. Bronze, 90% | 60.18 | 60.12 | 60.72 | 62.74 | 35.750 | 35.500 | 35.000 |
| Nickel Silver, 10% | 66.00 | 68.33g | 68.33 | .... | 32.500 | 32.250 | 16.250 |
| Phos. Bronze, A, 5% | 80.99 | 81.49 | 81.49 | 82.67 | 39.250 | 39.000 | 38.000 |
| Silicon Bronze | 66.54 | 65.73 | 66.58 | 68.68e | 37.875 | 37.625 | 37.875 |
| Manganese Bronze | 59.37 | 53.38 | 63.82 | .... | 27.000 | 26.750 | 26.000 |
| Muntz Metal | 53.74 | 49.55 | .... | .... | 27.000 | 26.750 | 26.250 |

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

**brass turnings, 17.50-18.00; new brass clippings, 27.50-28.00; light brass, 19.00-19.50; heavy yellow brass, 22.00-22.50; new brass rod ends, 26.00-26.50; auto radiators, unsweated, 24.50-25.00; cocks and faucets, 24.50-25.00; brass pipe 25.00-25.50.**

**Lead:** Heavy, 12.00-13.00; battery plates, 6.50-7.25; linotype and stereotype, 13.25-14.75; electrotype, 12.00-13.00; mixed babbitt, 15.25.

**Magnesium:** Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

**Monel:** Clippings, 60.00-65.00; old sheets, 55.00-65.00; turnings, 50.00; rods, 59.50-65.00.

**Nickel:** Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

**Zinc:** Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

### REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

**Aluminum:** 1100 clippings, 25.00; 3003 clippings, 24.75-25.00; 6151 clippings, 24.50-25.00; 5052 clippings, 24.50-25.00; 2014 clippings, 24.00-24.50; 2017 clippings, 24.00-24.50; 2024 clippings, 24.00-24.50; mixed clippings, 24.00-24.50; old sheet, 20.00-22.00; old cast, 21.00-22.00; clean old cable (free of steel), 25.00; borings and turnings, 22.00-23.00.

**Beryllium Copper:** Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 65.00; light scrap, 60.00; turnings and borings, 43.00-55.00.

**Copper and Brass:** No. 1 heavy copper and wire, 41.50; No. 2 heavy copper and wire, 40.00; light copper 37.75; refinery brass (60% copper) per dry copper content, 38.00.

### INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

**Copper and Brass:** No. 1 heavy copper and wire, 41.50; No. 2 heavy copper and wire, 40.00; light copper, 38.00; No. 1 composition borings, 33.50; No. 1 composition solids, 34.50; heavy yellow brass solids, 23.50; yellow brass turnings, 22.50; radiators, 26.50.

### PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

### ANODES

**Cadmium:** Special or patented shapes, $1.70 per lb.

**Copper:** Flat-rolled, 59.79, oval, 58.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

**Nickel:** Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

**Tin:** Bar or slab, less than 200 lb, $1.255; 200-499 lb, $1.240; 500-999 lb, $1.235; 1000 lb or more, $1.230.

**Zinc:** Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

### CHEMICALS

**Cadmium Oxide:** $2.15 per lb, in 100-lb drums. **Chromic Acid:** Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

**Copper Cyanide:** 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50. **Copper Sulphate:** 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

**Nickel Chloride:** 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

**Nickel Sulphate:** 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

**Silver Cyanide:** (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

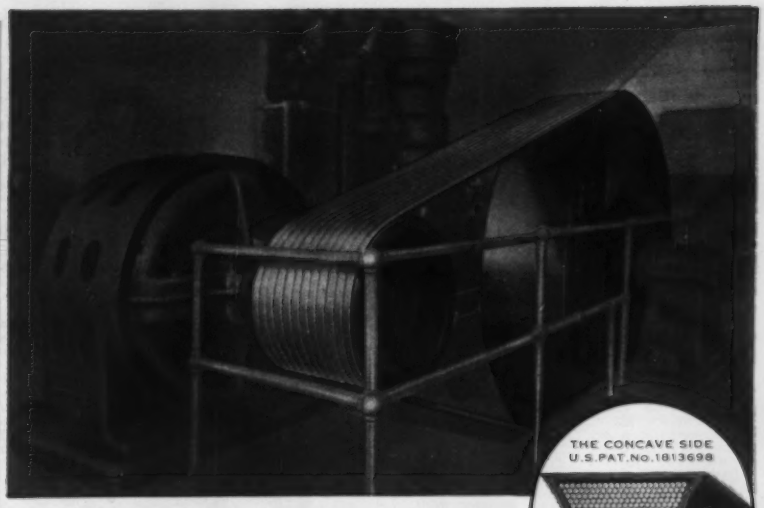
**Sodium Cyanide:** Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

**Sodium Stannate:** Less than 100 lb, 74.80; 100-600 lb, 66.10; 700-1900 lb, 63.60; 2000-9900 lb, 61.90; 10,000 lb or more, 60.70.

**Stannous Chloride (anhydrous):** Less than 25 lb, $1.726; 25 lb, $1.376; 100 lb, $1.226; 400 lb, $1.202; 5200-19,600 lb, $1.080; 20,000 lb or more, 95.80.

**Stannous Sulphate:** Less than 50 lb, $1.351; 50 lb, $1.051; 100-1900 lb, $1.031; 2000 lb or more, $1.011.

**Zinc Cyanide:** Under 1000 lb, 54.30; 1000 lb and over, 52.30.

Why a V-Belt with

CONCAVE SIDES

wears longer

It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight.* Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado —*World's Largest Maker of V-Belts.*

*There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.*

TPA 60

Gates VULCO ROPE Drives

# Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 113. Key to footnotes, Page 115.

## SEMIFINISHED

**INGOTS, Carbon, Forging (NT)**

Munhall,Pa. U5 ..... $65.50

**INGOTS, Alloy (NT)**

Detroit R7 ..... $89.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 89.00
Munhall,Pa. U5 ..... 89.00

**BILLETS BLOOMS & SLABS**
**Carbon, Rerolling (NT)**

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 .. 73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 76.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
S.Chicago,Ill R2 U5 .. 68.50
S.Duquesne,Pa. U5 .. 68.50
Youngstown R2 ..... 68.50

**Carbon, Forging (NT)**

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 89.50
Buffalo R2 ..... 84.50
Canton,O. R2, T7 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 92.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston S5 ..... 89.50
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
S.Chicago R2,U5,W14 .. 84.50
S.Duquesne,Pa. U5 .. 84.50
S.SanFrancisco B3 ... 94.00

**Alloy, Forging (NT)**

Bethlehem,Pa. B2 ... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ... 115.00
Gary,Ind. U5 ..... 96.00
Houston S5 ..... 101.00
Ind.Harbor,Ind. Y1 .... 96.00
Johnstown,Pa. B2 .... 96.00
Lackawanna,N.Y. B2.. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 .. 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

**ROUNDS, SEAMLESS TUBE (NT)**

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2,W14 ... 103.50
S.Duquesne,Pa. U5 ... 103.50

**SKELP**

Aliquippa,Pa. J5 .... 4.325
LoneStar,Tex. L6 .... 4.625
Munhall,Pa. U5 .... 4.225
SparrowsPoint,Md. B2.. 4.225
Warren,O. R2 .... 4.225
YoungstownR2, U5 ... 4.225

**WIRE RODS**

*AlabamaCity,Ala. R2 .. 5.375*
Aliquippa,Pa. J5 ..... 5.025
Alton,Ill L1 ..... 5.20
*Buffalo B11 ..... 5.025*
*Buffalo W12 ..... 5.375*
*Cleveland A7 ..... 5.375*
*Donora,Pa. A7 ..... 5.375*
*Fairfield,Ala. T2 ..... 5.375*
Houston S5 ..... 5.275
IndianaHarbor,Ind. Y1 .. 5.025
Johnstown,Pa. B2 .... 5.025
*Joliet,Ill. A7 ..... 5.375*
KansasCity,Mo. S5 .... 5.275
Kokomo,Ind. C16 .... 5.125
LosAngeles B3 ..... 5.825
Minnequa,Colo. C10 ... 5.275
Monessen,Pa. P7 .... 5.025
N.Tonawanda,N.Y. B11 .. 5.025
Pittsburg,Calif. C11 ... 5.675
Portsmouth,O. P12 .... 5.025
Roebling,N.J. R5 .... 5.125
*S.Chicago,Ill. R2 ..... 5.375*
SparrowsPoint,Md. B2 .. 5.125
Sterling,Ill. (1) N15 .... 5.025
Sterling,Ill. N15 ..... 5.125
Struthers,O. Y1 ..... 5.025
*Worcester,Mass. A7 ... 5.675*

## STRUCTURALS

**Carbon Steel Std. Shapes**

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 5.10
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.25
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2 .... 4.60
Johnstown,Pa. B2 .... 4.65
KansasCity, Mo. S5 .... 4.70
Lackawanna,N.Y. B2 .... 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 .... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 5.25
Portland,Oreg. O4 .... 5.35
Phoenixville,Pa. P4 .... 5.15
Seattle B3 ..... 5.35
S.Chicago U5, W14 .... 4.60
S.SanFrancisco B3 .... 5.25
Torrance,Calif. C11 .... 5.30
Weirton,W.Va. W6 .... 4.60

**Wide Flange**

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.40
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 .... 5.15
S.Chicago,Ill. U5 ..... 4.60

**Alloy Std. Shapes**

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.30
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

**H.S., L.A. Std. Shapes**

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston S5 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 .. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 .... 6.85
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14.. 6.75
S.SanFrancisco B3 .... 7.40
Struthers,O. Y1 ..... 6.75

**H.S., L.A. Wide Flange**

Bethlehem,Pa. B2 .... 6.80
Lackawanna,N.Y. B2 .. 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill U5 ..... 6.75

## PILING

**BEARING PILES**

Bethlehem,Pa. B2 .... 4.65
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

**STEEL SHEET PILING**

Ind.Harbor,Ind. I-2 .... 5.45
Lackawanna,N.Y. B2 ... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

## PLATES

**PLATES, Carbon Steel**

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .... 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 .... 4.80
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 .... 4.80
Conshohocken,Pa. A3 .. 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.15
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 .... 4.70
Harrisburg,Pa. P4 ..... 5.10
Houston S5 ..... 4.60
Ind.Harbor,Ind. I-2, Y1.. 4.50
Johnstown,Pa. B2 .... 4.50
Lackawanna,N.Y. B2 .. 4.50
LoneStar,Tex. L6 ..... 4.85
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.725
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14.. 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 .... 4.50
Youngstown R2, U5, Y1.. 4.50

**PLATES, Carbon Abras. Resist.**

Claymont,Del. C22 ..... 5.65
Fontana,Calif. K1 ..... 6.30
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

**PLATES, Wrought Iron**

Economy,Pa. B14 ..... 10.40

**PLATES,High-Strength Low-Alloy**

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Claymont,Del. C22 .... 6.725
Coatesville,Pa L7 ..... 7.025
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1 .. 7.375
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston S5 ..... 6.825
Ind.Harbor,Ind. I-2, Y1.. 6.725
Johnstown,Pa. B2 .... 6.725
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago,Ill. U5, W14.. 6.725
SparrowsPoint,Md. B2.. 6.725
Youngstown U5, Y1 ... 6.725

**PLATES, Alloy**

Bridgeport,Conn. N19 ... 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 6.95
Gary,Ind. U5 ..... 6.30
Houston S5 ..... 6.40
Ind.Harbor,Ind. Y1 ..... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago,Ill. U5, W14.. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

**FLOOR PLATES**

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. P4 .... 5.575
Ind.Harbor,Ind. I-2 .... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill. U5 ..... 5.575

**PLATES, Ingot Iron**

Ashland c.l. (15) A10... 4.75
Ashland l.c.l. (15) A10.. 5.25
Cleveland c.l R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

## BARS

**BARS, Hot-Rolled Carbon**

Ala.City, Ala.(9) R2 .... 4.65
Aliquippa,Pa. J5 ..... 4.65
Alton, Ill. L1 ..... 4.85
Atlanta A11 ..... 4.85
Bessemer,Ala.(9) T2.... 4.65
Birmingham C15 ..... 5.15
Bridgeport,Conn. N19 .. 4.80
Buffalo (9) R2 ..... 4.65
Canton,O. (9) R2 ..... 4.75
Clairton,Pa.(9) U5 .... 4.65
Cleveland (9) R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala.(9) T2 .... 4.65
FairlessHills,Pa.(9) U5.. 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind.(9) U5 ..... 4.65
Houston S5 ..... 4.90
Ind.Harbor,Ind. (9) I-2 4.65
Ind.Harbor,Ind. Y1 .... 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo. S5 .... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Massillon,O. (9) R2.... 4.75
Midland,Pa. C18 ..... 4.65
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.35
N.Tonawanda,N.Y. B11 .. 4.65
Pittsburg,Calif.(9) C11.. 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 .... 5.40
Seattle B3, N14 ..... 5.40
S.Chicago W14 ..... 4.65
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5... 4.65
S.SanFran.,Calif. B3 ... 5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif.(9) C11.. 5.35
Warren,O. (9) R2 .... 4.65
Weirton,W.Va. W6 .... 4.65
Youngstown(9) R2 .... 4.65
Youngstown(9) U5 .... 4.65

**BARS, H.R. Leaded Alloy**

Warren,O. C17 ..... 6.325

**BARS, Hot-Rolled Alloy**

Bethlehem,Pa. B2 .... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 .... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fontana, Calif. K1 .... 6.625
FairlessHills,Pa. U5 ... 5.725
Gary,Ind. U5 ..... 5.575
Houston S5 ..... 5.825
Ind.Harbor,Ind. I-2, Y1.5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. S5 .... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14.. 5.575
S.Duquesne,Pa. U5 .... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

**BARS & SMALL SHAPES, H.R.**
**High-Strength Low-Alloy**

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
Ind.Harb.,Ind. I-2, Y1.. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 .... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S. Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 .... 6.80
S.SanFrancisco B3 .... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

**BAR SIZE ANGLES; H.R. Carbon**

Bethlehem,Pa. B2 .... 4.80

**BAR SIZE ANGLES; S. Shapes**

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SanFrancisco S7 ..... 5.05

**BAR SHAPES, Hot-rolled Alloy**

Clairton,Pa. U5 ..... 5.65
Gary,Ind .U5 ..... 5.65
Houston S5 ..... 5.90
KansasCity,Mo. S5 ..... 5.90
Youngstown U5 ..... 5.65

**BARS, C.F. Leaded Alloy**

Ambridge,Pa. W18 .... 8.325
Camden,N.J. P13 ..... 8.35
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 ..... 8.30
Warren,O. C17 ..... 8.325

**BARS, Cold-Finished Carbon**

*Ambridge,Pa. W18 .... 6.25**
BeaverFalls,Pa. M12, R2 5.90
*Buffalo B5 ..... 6.30**
Camden,N.J. P13 ..... 6.35
Carnegie,Pa. C12 ..... 5.90
*Chicago W18 ..... 6.25**
Cleveland A7, C20 ..... 5.90
Detroit R7 ..... 5.90
*Detroit B5 ..... 6.45**
*Detroit P17 ..... 6.10*
Donora,Pa. A7 ..... 5.90
Elyria,O. W18 ..... 5.90
FranklinPark,Ill. N5 ... 5.90
Gary,Ind. R2 ..... 5.90
GreenBay,Wis. F7 ..... 5.90
Hammond,Ind. L2, M13.5.90
*Hartford,Conn. R2 .... 6.75**
*Harvey,Ill. B5 ..... 6.25**
LosAngeles S30 ..... 7.35
*LosAngeles R2 ..... 7.70**
*Mansfield,Mass. B5 .... 6.30**
Massillon,O. R2, R8 .... 5.90
Midland,Pa. C18 ..... 5.90
Monaca,Pa. S17 ..... 5.90
*Newark,N.J. W18 ..... 6.70**
NewCastle,Pa.(17) B4 .. 5.90
Pittsburgh J5 ..... 5.90
Plymouth,Mich. P5 .... 6.15
*Putnam,Conn. W18 ..... 6.80**
Readville,Mass. C14 .... 6.45
S.Chicago,Ill. W14 ..... 5.90
SpringCity,Pa. K3 ..... 6.35
Struthers,O. Y1 ..... 5.90
Waukegan,Ill. A7 ..... 5.90
Worcester,Mass. W19 .. 6.35
Youngstown F3, Y1 ... 5.90

*Including 0.35c for special quality.

**BARS, Cold-Finished Carbon**
**(Turned and Ground)**

Cumberland,Md.(5) C19.. 5.16

**BARS, Cold-Finished Alloy**

Ambridge,Pa. W18 .... 7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 .... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis F7 ..... 7.425
Hammond,Ind. L2,M13.7.425
Hartford,Conn. R2 .... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 ... 7.725
Massillon,O. R2, R8 .... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ..... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 .... 7.725
Youngstown F3, Y1 ... 7.425

**BARS, Reinforcing**
**(To Fabricators)**

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 4.85
Birmingham C15 ..... 5.15
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 ... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 .... 4.80
Fontana,Calif. K1 ..... 4.85
Ft. Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston S5 ..... 4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill P22 ....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 ....5.35
Milton,Pa. M18 ....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 ....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 ....4.65
Portland,Oreg. O4 ....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 ....5.40
S.Chicago R2 ....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill(1) N15 ....4.65
Sterling,Ill. N15 ....4.75
Struthers,O. Y1 ....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1 4.65

### BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 ..6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 ....6.15
Pittsburgh U8 ....6.17
Seattle B3, N14 ....6.60
SparrowsPt. ¼-1" B2..6.15
Williamsport,Pa. S19 ..6.00

### RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4...5.10
Franklin,Pa. (3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.50
Marion,O.(3) P11 ....4.65
Moline,Ill.(3) R2 ....4.65
Tonawanda(3) B12 ....4.65
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

### BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 ..11.50
McK.Rks. (D.R.) L5 ..16.00
McK.Rks.(Staybolt) L5.17.00

## SHEETS

### SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.325
Allenport,Pa. P7 ....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 ....4.425
Dravosburg,Pa. U5 ...4.325
Ecorse,Mich. G5 ....4.425
Fairfield,Ala. T2 ....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 ....4.325
Geneva,Utah C11 ....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6, (37)..4.325
Munhall,Pa. U5 ....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. M21 ....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 ....4.375
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 ....4.55
Sharon,Pa. S3 ....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2 .4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 ....4.325
Weirton,W.Va. W6 ...4.325
Youngstown U5, Y1 ..4.325

### SHEETS, H.R.(19 Ga. & Lighter)

Ala.City,Ala. R2 ....5.625
Niles,O. M21 ....5.325

### SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 ....7.20

### SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ..6.375
Ecorse,Mich. G5 ....6.475
Fairfield,Ala. T2 ....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 ....7.125
Gary,Ind U5 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
Sharon,Pa. S3 ....6.375
S.Chicago,Ill. U5 ....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 ....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ..6.375

### SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2....4.575

### SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ....5.325
Cleveland J5, R2 ....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 ....5.325
Ecorse,Mich. G5 ....5.425
Fairfield,Ala. T2 ....5.325
FairlessHills,Pa. U5 ..5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.425
Gary,Ind. U5 ....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 ....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 ....5.325
Pittsburg,Calif. C11 ...6.275
Pittsburgh J5 ....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2 ..5.325
Steubenville,O. W10 ..5.325
Warren,O. R2 ....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 ....5.325

### SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ....7.875
Dravosburg,Pa. U5 ..7.875
Ecorse,Mich. G5 ....7.975
FairlessHills,Pa. U5 ..7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 ....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 ....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 ....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 ....7.875

### SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

### SHEETS, Culver (16 Gage)

| | Cu Alloy | Cu Fe |
|---|---|---|
| Ashland,Ky. A10 | 6.90 | ... |
| Canton,O. R2 | 6.10 | 6.55 |
| Dravosburg U5 | 6.10 | ... |
| Fairfield T2 | 6.10 | ... |
| Gary,Ind. U5 | 6.10 | 6.35 |
| Ind.Harbor I-2 | 6.10 | 6.35 |
| Kokomo,Ind. C16 | 6.20 | ... |
| MartinsFry. W10 | 6.10 | ... |
| Newport,Ky. N9 | 6.10 | 6.35 |
| Pitts.,Calif. C11 | 6.85 | ... |
| SparrowsPt. B2 | 6.10 | ... |

### SHEETS, Culvert—Pure Iron

Ashland,Ky A10 ....7.15
Gary,Ind. U5 ....6.35
MartinsFry.,O. W10 ....6.35

### SHEETS, Galvanized Steel Hot-Dipped

Ala.City, Ala. R2 ....5.85‡
Ashland,Ky. A10 ....5.85†
Canton,O. R2 ....5.85‡
Dover,O. R1 ....5.85†
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 ....5.85†
Gary,Ind. U5 ....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 ....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ...5.85†
Newport,Ky. N9 ....5.85‡
Pittsburg,Calif. C11 ...6.60*
SparrowsPt.,Md. B2 ..5.85†
Warren,O. R2 ....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

### SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

### SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

### SHEETS, Galvannealed Steel

Canton,O. R2 ....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 ....6.60
Newport,Ky. N9 ....6.25

### SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ....6.10
Middletown,O. A10 ....6.10

### SHEETS, Electrogalvanized

Cleveland(28) R2 ....6.70
Niles,O.(28) R2 ....6.70
Weirton,W.Va. W6 ....6.55

### SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

### SHEETS, Enameling Iron

Ashland,Ky. A10 ....5.90
Cleveland R2 ....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 ....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 ....5.90
Youngstown Y1 ....5.90

### BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 ....7.75

### SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ....6.25
Mansfield,O. E6 ....6.25
Middletown,O. A10 ....6.25
Niles,O. M21 ....6.25
Weirton,W.Va. W6 ....6.25

### SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

## Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Ingoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

## STRIP

**STRIP, Hot-Rolled Carbon**

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 .....4.325
Birmingham C15 .....4.825
Bridgeport,Conn. N19 ..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2, Y1.4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(24) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ...5.425
NewBritain(10) S15 ...4.325
Pittsburg,Calif. C11 ...5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
SanFrancisco S7 .....5.05
Seattle(25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
S.SanFrancisco(25) B3..5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance,Calif. C11 ...5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5 .....4.325

**STRIP, Hot-Rolled Alloy**

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon Pa. S3 .....7.20
S.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

**STRIP, Hot-Rolled High-Strength Low-Alloy**

Bessemer,Ala. T2 ....6.425
Conshohocken,Pa. A3..6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 ....6.425
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1.6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
S.SanFrancisco(25) B3.7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 ....6.425
Youngstown U5, Y1 ...6.425

**STRIP, Hot-Rolled Ingot Iron**

Ashland,Ky.(8) A10 ...4.575

**STRIP, Cold-Rolled Carbon**

Anderson,Ind. G6 .....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland A7, J5 .....6.25
Conshohocken,Pa. A3 ..6.30
Dearborn,Mich. D3 .....6.35
Detroit D2, M1, P20....6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. F4 ...6.25
Fontana,Calif. K1 .....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2 ..6.25
LosAngeles C1 .....8.30
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ....6.25
NewCastle,Pa. B4, E5..6.25
NewHaven,Conn. A7, D2 6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 .....6.90
Pawtucket,R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6 .....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 ....6.25
Trenton,N.J.(31) R5 ...7.80
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 .....6.25
Weirton,W.Va. W6 .....6.25
Worcester,Mass. A7 ....6.80
Youngstown C8, Y1 ....6.25

**STRIP, Cold-Rolled Alloy**

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....13.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 .....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ...13.75
Youngstown C8 .....13.45

**STRIP, Cold-Rolled High-Strength Low-Alloy**

Cleveland A7 .....9.10
Dearborn,Mich. D3 ....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20
Ind.Harbor,Ind. Y1 ....9.30

| STRIP, Cold-Finished Spring Steel (Annealed) | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Baltimore T6 | 7.30 | 9.25 | 10.80 | 12.95 | 15.65 |
| Boston T6 | 7.55 | 9.25 | 10.80 | 12.95 | 15.65 |
| Bristol,Conn. W1 | ... | ... | 10.80 | 12.95 | 15.65 |
| Carnegie,Pa. S18 | ... | 9.05 | 10.60 | 12.75 | .... |
| Cleveland A7 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Cleveland C7 | ... | 8.95 | 10.50 | 12.65 | 15.35 |
| Dearborn,Mich. D3 | 7.20 | 9.15 | 10.70 | .... | .... |
| Detroit D2 | 7.20 | 9.15 | 10.70 | 12.85 | .... |
| Dover,O. G6 | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Follansbee,W.Va. F4 | 7.00 | 8.95 | 10.50** | .... | .... |
| FranklinPark,Ill. T6 | 7.10 | 8.95 | 10.50 | 12.65 | 15.35 |
| Harrison,N.J. C18 | ... | ... | 10.80 | 12.95 | 15.65 |
| Indianapolis C8 | 7.25 | 9.20 | 10.60 | 12.75 | 15.45 |
| NewBritain,Conn.(10) S15. | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| NewCastle, Pa. B4, E5 .... | 7.10 | 9.05 | 10.60 | 12.75 | ... |
| NewHaven,Conn. D2 .... | 7.55 | 9.35 | 10.90 | 13.05 | .... |
| NewKensington,Pa. A6 .... | 7.10 | 9.05 | 10.60 | .... | .... |
| New York W3 .... | ... | 9.25 | 10.80 | 12.95 | 15.65 |
| Pawtucket,R.I. N8 .... | 7.55 | 9.25 | 10.80 | 12.95 | 15.35 |
| Riverdale,Ill. A1 .... | 7.20 | 9.05 | 10.60 | 12.75 | 15.45 |
| Rome,N.Y.(32) R6 .... | 7.00 | 8.95 | 10.50 | 12.65 | 15.35 |
| Sharon,Pa. S3 .... | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| *Trenton,N.J. R5* .... | | *9.35* | *10.90* | *13.05* | *15.75* |
| Wallingford,Conn. W2 .... | 7.45 | 9.25 | 10.80 | 12.95 | 15.65 |
| Warren,O. T5 .... | 7.00 | 8.95 | 10.50 | 12.65 | 15.35 |
| Weirton,W.Va. W6 .... | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |
| Worcester,Mass. T6 .... | 7.55 | 9.25 | 10.80 | 12.95 | 15.65 |
| Worcester,Mass. A7 .... | 7.65 | 9.35 | 10.90 | 13.05 | 15.75 |
| Youngstown C8 .... | 7.10 | 9.05 | 10.60 | 12.75 | 15.45 |

**0.65 C, max.

| Spring Steel (Tempered) | | | | | |
|---|---|---|---|---|---|
| Bristol,Conn. W1 .... | ... | ... | 14.40 | 17.60 | .... |
| Buffalo W12 .... | ... | ... | 14.40 | .... | .... |
| FranklinPark,Ill. T6 .... | ... | ... | 14.90 | 18.10 | 21.50 |
| Harrison,N.J. C18 .... | ... | ... | 14.40 | 17.60 | 21.00 |
| New York W3 .... | ... | ... | 14.40 | 17.60 | 21.00 |
| Trenton,N.J. R5 .... | ... | ... | 14.40 | 17.60 | 21.00 |
| Worcester,Mass. W12 .... | ... | ... | 14.40 | .... | .... |
| Worcester,Mass. A7, T6 .. | ... | ... | 14.40 | 17.60 | 21.00 |
| Youngstown C8 .... | ... | ... | 15.00 | 18.35 | 22.35 |

Lackawanna,N.Y. B2 ..9.10
Sharon,Pa. S3 .....9.10
SparrowsPoint,Md. B2 ..9.10
Warren,O. R2 .....9.10
Weirton,W.Va. W6 .....9.10
Youngstown Y1 .....9.30

**STRIP, Electrogalvanized**

Cleveland A7 .....6.25*
Dover,O. G6 .....6.25*
Riverdale,Ill. A1 .....6.35*
Youngstown C8 .....6.25*
Warren,O. T5 .....6.25*
Warren,O. B9 .....6.45*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ...6.80*

*Plus galvanizing extras.

**STRIP, Galvanized (Continuous)**

Sharon,Pa. S3 .....6.55

**TIGHT COOPERAGE HOOP**

Atlanta A11 .....5.05
Riverdale,Ill. A1 .....4.90
Sharon,Pa. S3 .....4.75
Youngstown U5 .....4.75

## SILICON STEEL

| H.R. SHEETS(22 Ga., cut lengths) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| BeechBottom,W.Va. W10 .. | ... | ... | 9.95 | 10.95 | 11.85 |
| Brackenridge,Pa. A4 .... | ... | ... | 9.95 | 10.95 | 11.85 |
| Mansfield,O. E6 .... | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Newport,Ky. N9 .... | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Niles,O. M21 .... | 8.40 | 9.35 | 9.95 | 10.95 | .... |
| Vandergrift,Pa. U5 .... | ... | 9.35 | 9.95 | 10.95 | 11.85 |
| Warren,O. R2 .... | 8.40 | 9.35 | 9.95 | 10.95 | 11.85 |
| Zanesville,O. A10 .... | ... | 9.35 | 9.95 | 10.95 | 11.85 |

| C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower) | Field | Armature | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| Brackenridge,Pa. A4 .... | ... | .... | 10.70 | 11.70 | 12.60 |
| GraniteCity,Ill. G4 .... | 8.80* | 9.80* | 10.40* | 11.40* | .... |
| IndianaHarbor,Ind. I-2 .. | 8.60† | 9.60* | 10.20* | 11.20* | .... |
| Vandergrift,Pa. U5 .... | ... | 10.10† | 10.70† | 11.70† | 12.60† |
| Vandergrift,Pa. U5 .... | 8.60* | 9.60* | 10.20* | 11.20* | 12.10* |
| Warren,O. R2 .... | 8.60† | 10.10 | 10.70 | 11.70 | 12.60 |

| | Transformer Grade | | | |
|---|---|---|---|---|
| H.R. SHEETS (22 Ga., cut lengths) | T-72 | T-65 | T-58 | T-52 |
| BeechBottom,W.Va. W10 .... | 12.80 | 13.35 | 13.85 | 14.85 |
| Brackenridge,Pa. A4 .... | 12.80 | .... | .... | .... |
| Newport,Ky. N9 .... | 12.80 | .... | .... | .... |
| Vandergrift,Pa. U5 .... | 12.80 | 13.35 | 13.85 | 14.85 |
| Zanesville,O. A10 .... | 12.80‡ | 13.35‡ | 13.85‡ | 14.85‡ |

| C.R. COILS & CUT LENGTHS (22 Ga.) | Grain Oriented T-100 | T-90 | T-80 | T-73 | T-72 |
|---|---|---|---|---|---|
| Brackenridge,Pa. A4 .... | .... | 15.85 | 17.45 | 17.95 | 13.55‡ |
| Butler,Pa. A10 .... | .... | .... | 17.45 | 17.95 | .... |
| Vandergrift,Pa. U5 .... | 14.85 | 15.85 | 17.45 | 17.95 | 13.55 |
| Warren,O. R2 .... | .... | .... | .... | .... | 13.55‡ |

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

## TIN MILL PRODUCTS

| TIN PLATE Electrolytic (Base Box) | 0.25 lb | 0.50 lb | 0.75 lb |
|---|---|---|---|
| Aliquippa,Pa. J5 .... | $7.90 | $8.15 | $8.55 |
| Dravosburg,Pa. U5 .... | 7.90 | 8.15 | 8.55 |
| Fairfield,Ala. T2 .... | 8.00 | 8.25 | 8.65 |
| FairlessHills,Pa. U5 .... | 8.00 | 8.25 | 8.65 |
| Gary,Ind. U5 .... | 7.90 | 8.15 | 8.55 |
| GraniteCity,Ill. G4 .... | 8.00 | 8.25 | 8.65 |
| IndianaHarbor,Ind. I-2, Y1 .... | 7.90 | 8.15 | 8.55 |
| Niles,O. R2 .... | 7.90 | 8.15 | 8.55 |
| Pittsburg,Calif. C11 .... | 8.65 | 8.90 | 9.30 |
| SparrowsPoint,Md. B2 .... | 8.00 | 8.25 | 8.65 |
| Weirton,W.Va. W6 .... | 7.90 | 8.15 | 8.55 |
| Yorkville,O. W10 .... | 7.90 | 8.15 | 8.55 |

| ELECTROTIN (22-27 Gage; Dollars per 100 lb) | | | |
|---|---|---|---|
| Aliquippa,Pa. J5 .... | 6.675 | .... | .... |
| Niles,O. R2 .... | 6.675 | 6.875 | 7.075 |

| TINPLATE, American Coke (Base Box) | 1.25 lb | 1.50 lb |
|---|---|---|
| Aliquippa,Pa. J5 | $9.20 | $9.45 |
| Dravosburg,Pa.U5 | 9.20 | 9.45 |
| Fairfield,Ala. T2 | 9.30 | 9.55 |
| Fairless,Pa. U5 .. | 9.30 | 9.55 |
| Gary,Ind. U5 .... | 9.20 | 9.45 |
| Ind.Har. I-2, Y1 | 9.20 | 9.45 |
| Pitts.,Calif. C11.. | 9.95 | 10.20 |
| Sp.Pt.,Md. B2 ... | 9.30 | 9.55 |
| Weirton,W.Va. W6 | 9.20 | 9.45 |
| Yorkville,O. W10 | 9.20 | 9.45 |

**BLACK PLATE (Base Box)**

Aliquippa,Pa. J5 .....$7.00
Dravosburg,Pa. U5 ....7.00
Fairfield,Ala. T2 .....7.10
FairlessHills,Pa. U5 ....7.10
Gary,Ind. U5 .....7.00
GraniteCity,Ill. G4 ....7.10
Ind.Harbor,Ind. I-2, Y1.7.00
Niles,O. R2 .....7.00
Pittsburg,Calif. C11 ....7.75
SparrowsPoint,Md. B2...7.10
Warren,O. R2 .....7.00
Weirton,W.Va. W6 .....7.00
Yorkville,O. W10 .....7.00

**HOLLOWARE ENAMELING Black Plate (29 Gage)**

Dravosburg,Pa. U5 ....6.65
Gary,Ind. U5 .....6.65
GraniteCity,Ill. G4 .....6.75
Ind.Harbor,Ind. Y1 ....6.65
Yorkville,O. W10 .....6.65

**MANUFACTURING TERNES (Special Coated; Base Box)**

Dravosburg,Pa. U5 ...$8.70
Gary,Ind. U5 .....8.70
Yorkville,O. W10 .....8.70

**MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)**

Yorkville,O. W10 .....$9.15

**ROOFING SHORT TERNES (8 lb Coated; Base Box)**

Gary,Ind. U5 .....$10.25

## WIRE

**WIRE, Manufacturers Bright, Low Carbon**

*AlabamaCity,Ala. R2 ...6.60*
Aliquippa,Pa. J5 .....6.25
Alton,Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville,Ill. K4 .....6.35
*Buffalo W12 .....6.60*
Chicago W13 .....6.25
*Cleveland A7 .....6.60*
Crawfordsville,Ind. M8..6.35
*Donora,Pa. A7 .....6.60*
*Duluth,Minn. A7 .....6.60*
*Fairfield,Ala. T2 .....6.60*
Fostoria,O.(24) S1 .....6.45
Houston S5 .....6.50
Jacksonville,Fla. M8 ...6.77
Johnstown,Pa. B2 .....6.25
*Joliet,Ill. A7 .....6.60*
KansasCity,Mo. S5 ....6.50
Kokomo,Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.50
Monessen,Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N.Tonawanda B11 .....6.25
*Palmer,Mass. W12 .....6.90*
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.25
*Rankin,Pa. A7 .....6.60*
*S.Chicago,Ill. R2 .....6.60*
S.SanFrancisco C10 ....7.20
SparrowsPoint,Md. B2 ..6.35
Sterling,Ill.(1) N15 ....6.25
Sterling,Ill. N15 .....6.35
Struthers,O. Y1 .....6.25
*Waukegan,Ill. A7 .....6.60*
*Worcester,Mass. A7 .....6.90*

**WIRE, MB Spring, High Carbon**

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 .....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 .....8.20
Pittsburg,Calif. C11 ....8.85
Portsmouth,O. P12 .....7.90
Roebling,N.J. R5 .....8.20
S.Chicago,Ill. R2 .....7.90
S.SanFrancisco C10 ....8.85
SparrowsPt.,Md. B2 ...8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester A7,J4,T6,W12.8.20

**WIRE, Upholstery Spring**

Aliquippa,Pa. J5 .....7.60
Alton,Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora,Pa. A7 .....7.60
Duluth,Minn. A7 .....7.60
Johnstown,Pa. B2 .....7.60
KansasCity,Mo. S5 .....7.85
LosAngeles B3 .....8.55
Minnequa,Colo. C10 ...7.775
Monessen,Pa. P16 .....7.60
NewHaven,Conn. A7 ...7.90
Palmer,Mass. W12 .....7.90
Pittsburg,Calif. C11 ....8.55
Portsmouth,O. P12 .....7.60
Roebling,N.J. R5 .....7.90
S.Chicago,Ill. R2 .....7.60
S.SanFrancisco C10 ....8.55
SparrowsPoint,Md. B2 ..7.70
Struthers,O. Y1 .....7.60
Trenton,N.J. A7 .....7.90
Waukegan,Ill. A7 .....7.60
Worcester,Mass. A7 ....7.90

**WIRE, Fine & Weaving (8" Coils)**

Alton,Ill. L1 .....12.725
Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville,Ind. M8.12.65
Fostoria,O. S1 .....12.55
Jacksonville,Fla. M8 ..13.08
Johnstown,Pa. B2 .....12.55
Kokomo,Ind. C16 .....12.55
Minnequa,Colo. C10 ....12.30
Monessen,Pa. P6 .....12.55
Muncie,Ind. I-7 .....12.75
Palmer,Mass. W12 .....12.85
Roebling,N.J. R5 .....12.85
S.SanFrancisco C10 ....12.90
Waukegan,Ill. A7 .....12.55
Worcester,Mass. A7,T6.12.85

**WIRE, Gal'd ACSR for Cores**

Bartonville,Ill. K4 .....10.70
Buffalo W12 .....10.70
Johnstown,Pa. B2 .....10.70
Minnequa,Colo. C10 ..10.825
Monessen,Pa. P16 ....10.70
Muncie,Ind. I-7 .....10.90
Pittsburg,Calif. C11 ..11.50
Portsmouth,O. P12 ....10.70
Roebling,N.J. R5 .....11.00
SparrowsPt.,Md. B2 ...10.80

**ROPE WIRE (A)**

Bartonville,Ill. K4 .....10.55
Buffalo W12 .....10.55
Fostoria,O. S1 .....10.55
Johnstown,Pa. B2 .....10.55
Monessen,Pa. P16 .....10.55
Muncie,Ind. I-7 .....10.75
Palmer,Mass. W12 .....10.85
Portsmouth,O. P12 .....10.55
Roebling,N.J. R5 .....10.85
SparrowsPt. B2 .....10.65
Struthers,O. Y1 .....10.55
Worcester,Mass. J4 .....10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

## WIRE
(Continued)

**WIRE, Tire Bead**

| | |
|---|---|
| Bartonville,Ill. K4 | 14.15 |
| Monessen,Pa. P16 | 14.20 |
| Roebling,N.J. R5 | 14.35 |

**WIRE, Cold-Rolled Flat**

| | |
|---|---|
| Anderson,Ind. G6 | 9.00 |
| Baltimore T6 | 9.30 |
| Buffalo W12 | 9.00 |
| Cleveland A7 | 9.00 |
| Crawfordsville,Ind. M8 | 9.00 |
| Dover,O. G6 | 9.00 |
| Fostoria,O. S1 | 9.00 |
| FranklinPark,Ill. T6 | 9.10 |
| Kokomo,Ind. C16 | 9.00 |
| Massillon,O. R8 | 9.00 |
| Milwaukee C23 | 9.20 |
| Monessen,Pa. P16 | 9.00 |
| Pawtucket,R.I. N8 | 9.30 |
| Riverdale,Ill. A1 | 9.10 |
| Rome,N.Y. R6 | 9.00 |
| Trenton,N.J. R5 | 9.30 |
| Worcester A7, T6, W12 | 9.30 |

**NAIL, Stock**

| To Dealers & Mfrs. (7) | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 152 |
| Aliquippa,Pa. J5 | 152 |
| Atlanta A11 | 154 |
| Bartonville,Ill. K4 | 154 |
| Chicago,Ill. W13 | 152 |
| Cleveland A9 | 157 |
| Crawfordsville,Ind. M8 | 154 |
| Donora,Pa. A7 | 152 |
| Duluth,Minn. A7 | 152 |
| Fairfield,Ala. T2 | 152 |
| Galveston,Tex. D7 | 157 |
| Houston,Tex. S5 | 157 |
| Johnstown,Pa. B2 | 152 |
| Joliet,Ill. A7 | 152 |
| KansasCity,Mo. S5 | 157 |
| Kokomo,Ind. C16 | 154 |
| Minnequa,Colo. C10 | 157 |
| Monessen,Pa. P7 | 152 |
| Pittsburg,Calif. C11 | 171 |
| Rankin,Pa. A7 | 152 |
| S.Chicago,Ill. R2 | 152 |
| SparrowsPt.,Md. B2 | 154 |
| Sterling,Ill.(1) N15 | 152 |
| Worcester,Mass. A7 | 158 |

**NAILS, CUT (100 lb keg)**

| To Dealers (33) | |
|---|---|
| Conshohocken,Pa. A3 | $9.05 |
| Wheeling,W.Va. W10 | 9.05 |

**STAPLES, Polished Stock**

| To Dealers & Mfrs. (7) | Col. |
|---|---|
| Aliquippa,Pa. J5 | 152 |
| Atlanta A11 | 154 |
| Bartonville,Ill. K4 | 154 |
| Crawfordsville,Ind. M8 | 154 |
| Donora,Pa. A7 | 152 |
| Duluth,Minn. A7 | 152 |
| Fairfield,Ala. T2 | 152 |
| Johnstown,Pa. B2 | 152 |
| Joliet Ill. A7 | 152 |
| Kokomo Ind. C16 | 154 |
| Minnequa,Colo. C10 | 157 |
| Monessen,Pa. P7 | 152 |
| Pittsburg,Calif. C11 | 171 |
| Rankin,Pa. A7 | 152 |
| SparrowsPt.,Md. B2 | 154 |
| Sterling,Ill.(1) N15 | 152 |
| Worcester,Mass. A7 | 158 |

**TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)**

| Coil No. 3150 | |
|---|---|
| AlabamaCity,Ala. R2 | $9.35 |
| Bartonville,Ill. K4 | 9.45 |
| Buffalo W12 | 9.35 |
| Crawfordsville,Ind. M8 | 9.46 |
| Donora,Pa. A7 | 9.35 |
| Duluth,Minn. A7 | 9.35 |
| Johnstown,Pa. B2 | 9.35 |
| Joliet,Ill. A7 | 9.35 |
| Kokomo,Ind. C16 | 9.45 |
| LosAngeles B3 | 10.14 |
| Minnequa,Colo. C10 | 9.60 |
| Pittsburg,Calif. C11 | 10.13 |
| S.Chicago Ill. R2 | 9.35 |
| SparrowsPt.,Md. B2 | 9.45 |
| Sterling,Ill. N15 | 9.35 |
| **Coil No. 6500 Stand.** | |
| AlabamaCity,Ala. R2 | $9.65 |
| Bartonville,Ill. K4 | 9.75 |
| Buffalo W12 | 9.65 |
| Crawfordsville,Ind. M8 | 9.75 |
| Donora,Pa. A7 | 9.65 |
| Duluth,Minn. A7 | 9.65 |
| Johnstown,Pa. B3 | 9.65 |
| Joliet,Ill. A7 | 9.65 |
| Kokomo,Ind. C16 | 9.75 |
| LosAngeles B3 | 10.45 |
| Minnequa,Colo. C10 | 9.90 |
| Pittsburg,Calif. C11 | 10.45 |
| S.Chicago,Ill. R2 | 9.65 |
| SparrowsPt.,Md. B2 | 9.75 |
| Sterling,Ill. N15 | 9.65 |
| **Coil No. 6500 Interim** | |
| AlabamaCity,Ala. R2 | $9.70 |
| Bartonville,Ill. K4 | 9.80 |
| Buffalo W12 | 9.70 |
| Crawfordsville,Ind. M8 | 9.80 |
| Donora,Pa. A7 | 9.70 |
| Duluth,Minn. A7 | 9.70 |
| Johnstown,Pa. B2 | 9.70 |
| Joliet,Ill. A7 | 9.70 |
| Kokomo,Ind. C16 | 9.80 |
| LosAngeles B3 | 10.50 |
| Minnequa,Colo. C10 | 9.95 |
| Pittsburg,Calif. C11 | 10.50 |
| S.Chicago,Ill. R2 | 9.70 |
| SparrowsPt.,Md. B2 | 9.80 |
| Sterling,Ill. N15 | 9.70 |

**WIRE, Barbed**

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 175** |
| Aliquippa,Pa. J5 | 172§ |
| Atlanta A11 | 181 |
| Bartonville,Ill. K4 | 181 |
| Crawfordsville,Ind. M8 | 181 |
| Donora,Pa. A7 | 175† |
| Duluth,Minn. A7 | 175† |
| Fairfield,Ala. T2 | 175† |
| Houston,Tex. S5 | 180† |
| Johnstown,Pa. B2 | 179* |
| Joliet,Ill. A7 | 175† |
| KansasCity,Mo. S5 | 180† |
| Kokomo,Ind. C16 | 177† |
| Minnequa,Colo. C10 | 180** |
| Monessen,Pa. P7 | 178†† |
| Pittsburg,Calif. C11 | 195† |
| Rankin,Pa. A7 | 175† |
| S.Chicago,Ill. R2 | 175** |
| S.SanFrancisco C10 | 195** |
| SparrowsPoint,Md. B2 | 181* |
| Sterling,Ill.(1) N15 | 179†† |

**WOVEN Fence, 9-15 ga.**

| | Col. |
|---|---|
| Ala.City,Ala. R2 | 162** |
| Ala.City, 17 ga. R2 | 257** |
| Ala.City, 18 ga. R2 | 267** |
| Aliq'ppa,Pa.9-14½ga J5 | 165§ |
| Atlanta A11 | 168 |
| Bartonville,Ill. K4 | 168 |
| Crawfordsville,Ind. M8 | 168 |
| Donora,Pa. A7 | 162† |
| Duluth,Minn. A7 | 162† |
| Fairfield,Ala. T2 | 162† |
| Houston Tex. S5 | 167† |
| Johnstown,Pa.(43) B2 | 166 |
| Joliet,Ill. A7 | 162† |
| KansasCity,Mo. S5 | 167† |
| Kokomo Ind. C16 | 164† |
| Minnequa,Colo. C10 | 167** |
| Monessen,Pa. 9 ga. P17 | 166†† |
| Pittsburg,Calif. C11 | 185† |
| Rankin,Pa. A7 | 162† |
| S.Chicago,Ill. R2 | 162** |
| Sterling,Ill.(1) N15 | 166†† |

**WIRE (16 Gage)**

| | An'ld Stone | Galv. Stone |
|---|---|---|
| Ala.City R2 | 14.50 | 16.05** |
| Bartonville K4 | 14.60 | 16.55 |
| Buffalo W12 | 14.50 | ---- |
| Cleveland A7 | 14.50 | ---- |
| Crawf'dsville M8 | 14.60 | 16.55 |
| Fostoria,O. S1 | 14.60 | 16.15† |
| Johnstown B2 | 14.50 | 16.40* |
| Kokomo C16 | 14.60 | 16.15† |
| Minnequa C10 | 14.75 | 16.45** |
| Palmer,MassW12 | 14.50 | 16.05* |
| Pitts.,Calif. C11 | 14.85 | 16 40† |
| S.Chicago R2 | 14.50 | 16.05** |
| SparrowsPt. B2 | 14.60 | 16.50* |
| Sterling(1) N15 | 14.50 | 16.45†† |
| Waukegan A7 | 14.50 | 16.05† |
| Worcester A7 | 14.80 | ---- |

**WIRE, Merchant Quality (6 to 8 gage)**

| | An'ld | Galv. |
|---|---|---|
| Ala.City,Ala. R2 | 7.40 | 7.80** |
| Aliquippa J5 | 7.40 | 7.925§ |
| Atlanta A11 | 7.50 | 8.10 |
| Bartonville(48) K4 | 7.50 | 8.10 |
| Buffalo W12 | 7.40 | 8.80† |
| Cleveland A7 | 7.40 | ---- |
| Crawfordsville M8 | 7.50 | 8.10 |
| Donora,Pa. A7 | 7.40 | 7.80† |
| Duluth,Minn. A7 | 7.40 | 7.80† |
| Fairfield T2 | 7.40 | 7.80† |
| Houston,Tex. S5 | 7.65 | 8.05† |
| Jacks'ville,Fla.M8 | 7.90 | 8.475 |
| Johnstown B2(48) | 7.40 | 7.975* |
| Joliet,Ill. A7 | 7.40 | 7.80† |
| KansasCity,Mo. S5 | 7.65 | 8.05† |
| Kokomo C16 | 7.50 | 7.90† |
| LosAngeles B3 | 8.35 | 8.925* |
| Minnequa C10 | 7.65 | 8.05** |
| Monessen P7(48) | 7.40 | 8.00†† |
| Palmer,Mass. W12 | 7.70 | 8.10† |
| Pitts.,Calif. C11 | 8.35 | 8.75† |
| Portsmouth,O. P12 | 7.40 | ---- |
| Rankin A7 | 7.40 | 7.80† |
| S.Chicago R2 | 7.40 | 7.80** |
| S.SanFran. C10 | 8.35 | 8.75** |
| Spar'wsPt.B2(48) | 7.50 | 8.075* |
| Str'ling(1)(48)N15 | 7.40 | 8.00†† |
| Struthers,O.(48)Y1 | 7.40 | 7.90‡ |
| Worcester,Mass.A7 | 7.70 | ---- |

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

**BALE TIES, Single Loop**

| | Col. |
|---|---|
| AlabamaCity,Ala. R2 | 173 |
| Atlanta A11 | 175 |
| Bartonville,Ill. K4 | 175 |
| Crawfordsville,Ind. M8 | 175 |
| Donora,Pa. A7 | 173 |
| Duluth,Minn. A7 | 173 |
| Fairfield,Ala. T2 | 173 |
| Joliet,Ill. A7 | 173 |
| Houston S5 | 178 |
| KansasCity,Mo. S5 | 178 |
| Kokomo,Ind. C16 | 175 |
| Minnequa,Colo. C10 | 178 |
| S.Chicago R2 | 173 |
| S.SanFran.,Calif. C10 | 197 |
| SparrowsPoint,Md. B2 | 175 |
| Sterling,Ill.(1) N15 | 173 |

**FENCE POSTS**

| | Col. |
|---|---|
| ChicagoHts.,Ill. C2, I-2 | 157 |
| Duluth,Minn. A7 | 157 |
| Franklin,Pa. F5 | 157 |
| Huntington,W.Va. W7 | 157 |
| Johnstown,Pa. B2 | 157 |
| Marion,O. P11 | 157 |
| Minnequa,Colo. C10 | 162 |
| Moline,Ill. R2 | 162 |
| S.Chicago,Ill. R2 | 157 |
| Tonawanda,N.Y. B12 | 157 |
| Williamsport,Pa. S10 | 160 |

## FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

**Carriage, Machine Bolts**

Full-Size Body (cut thread)
- †½" x 6" and smaller 61
- Larger than ½" diam. and all diams. longer than 6" 55

Under-Size Body (rolled thread; not nutted): ¼" x 6" and smaller. 61

†1½" x 4" and smaller and shorter are not nutted.

**Carriage, Machine & Lag Bolts, Hot Galvanized:**
- ½" and smaller 42
- Larger than ½" diam. and all diams. longer than 6" 32

**Lag Bolts**
- All diams. & 6" and shorter 61
- All diams. longer than 6" 55

**Plow, Tap & Blank Bolts**
- ½" x 6" and smaller. 61
- Larger than ½" diam. and all diams. longer than 6" 55

**Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:**
- All sizes 61

**STOVE BOLTS, SLOTTED (nuts not attached; bulk)**
- ⅛" to ¼" diam. incl., 3" or shorter:
  - 25 000 to 199,999 pieces 61
  - 200,000 or more pieces 64
- 5/16" to ½" diam. incl., 3" or shorter:
  - 15,000 to 99,999 pieces 61
  - 100,000 or more pieces 64
- Longer than 3", any diam.:
  - 5000 to 99,999 pieces. 61
  - 100,000 or more pieces 64

## RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅛-in. under..List less 32%

## BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

| O.D. In. | B.W. Gage | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. |
|---|---|---|---|---|
| 1 | 13 | .... | 21.06 | 20.42 |
| 1¼ | 13 | .... | 24.94 | 20.45 |
| 1½ | 13 | 23.31 | 27.57 | 22.61 |
| 1¾ | 13 | 27.54 | 32.57 | 26.71 |
| 2 | 13 | 30.87 | 36.51 | 29.93 |
| 2¼ | 13 | 34.77 | 41.12 | 33.72 |
| 2½ | 12 | 37.73 | 44.63 | 36.60 |
| 2¾ | 12 | 41.57 | 49.16 | 40.31 |
| 2¾ | 12 | 45.00 | 53.22 | 43.65 |
| 3 | 12 | 47.99 | 56.76 | 46.55 |

## RAILWAY MATERIALS

| RAILS | Standard No. 1 | Standard No. 2 | Tee Rails All No. 2 | Tee Rails 60 lb Under |
|---|---|---|---|---|
| Bessemer,Pa. U5 | 4.725 | 4.625 | 4.675 | 5.65 |
| Ensley,Ala. T2 | 4.725 | 4.625 | .... | 5.65 |
| Fairfield,Ala. T2 | .... | .... | .... | 5.65 |
| Gary,Ind. U5 | 4.725 | 4.625 | 4.675 | .... |
| Huntington,W.Va. W7 | .... | .... | .... | 5.65 |
| IndianaHarbor,Ind. I-2 | 4.725 | 4.625 | 4.675 | .... |
| Johnstown,Pa. B2 | .... | .... | ...(16) | 5.65 |
| Lackawanna,N.Y. B2 | 4.725 | 4.625 | ...(16) | 5.65 |
| Minnequa,Colo. C10 | 4.725 | 4.625 | .... | 6.15 |
| Steelton,Pa. B2 | 4.725 | 4.625 | .... | .... |
| Williamsport,Pa. S19 | .... | .... | .... | 5.65 |

**TIE PLATES**

| | |
|---|---|
| Fairfield,Ala. T2 | 5.625 |
| Gary,Ind. U5 | 5.625 |
| Ind.Harbor,Ind. I-2 | 5.625 |
| Lackawanna,N.Y. B2 | 5.625 |
| Minnequa,Colo. C10 | 5.625 |
| Seattle B3 | 5.775 |
| Steelton,Pa. B2 | 5.625 |
| Torrance,Calif. C11 | 5.775 |

**TRACK BOLTS (20) Treated**

| | |
|---|---|
| *Cleveland R2* | *12.90* |
| KansasCity,Mo. S5 | 12.40 |
| Lebanon,Pa. B2 | 12.40 |
| Minnequa,Colo. C10 | 12.40 |
| Pittsburgh O3, P14 | 12.90* |
| Seattle B3 | 12.90 |

*0.75 off for untreated

**AXLES**

| | |
|---|---|
| Ind.Harbor,Ind. S13 | 7.25 |
| Johnstown,Pa. B2 | 7.25 |

**JOINT BARS**

| | |
|---|---|
| Bessemer,Pa. U5 | 5.825 |
| Fairfield,Ala. T2 | 5.825 |
| Ind.Harbor,Ind. I-2 | 5.825 |
| Joliet,Ill. U5 | 5.825 |
| Lackawanna,N.Y. B2 | 5.825 |
| Minnequa,Colo. C10 | 5.825 |
| Steelton,Pa. B2 | 5.825 |

**SCREW SPIKES**

| | |
|---|---|
| Cleveland R2 | 11.90 |
| Pittsburgh O3 | 11.90 |

**STANDARD TRACK SPIKES**

| | |
|---|---|
| Fairfield,Ala. T2 | 7.90 |
| Ind.Harbor, Ind. I-2, Y1 | 7.90 |
| KansasCity,Mo. S5 | 7.90 |
| Lebanon,Pa. B2 | 7.90 |
| Minnequa,Colo. C10 | 7.90 |
| Pittsburgh J5 | 7.90 |
| Seattle B3 | 8.40 |
| S.Chicago,Ill. R2 | 7.90 |
| Struthers,O. Y1 | 7.90 |
| Youngstown R2 | 7.90 |

## METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

| | Cents |
|---|---|
| Sponge iron: 98+% Fe, annealed. | 9.25 |
| Swedish, c.i.f. Camden, N. J., c.l. in bags. | 9.50 |
| Domestic, f.o.b. Riverton, N.J. and Niagara Falls, N. Y., in bags | 9.50 |
| Canadian, f.o.b. Shipping point | 9.50 |
| Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in. | 22.00 |
| Annealed, 99.5% Fe. | 36.50 |
| Unannealed (99+% Fe) | 34.00 |
| Unannealed (99+% Fe) (minus 325 mesh) | 57.00 |
| Powder Flakes (minus 16, plus 100 mesh).. | 31.00 |
| Carbonyl Iron: 97.9-99.8% size 5 to 10 microns..83.00-148.00 | |
| Aluminum: Atomized, 500 lb. drum frght. allowed Carlots | 34.50 |
| Ton lots | 36.50 |
| Antimony, 500 lb lots | 32.00* |
| Brass, 5000-lb lots | 38.00-50.00† |
| Bronze, 5000-lb lots | 61.25-64.50† |
| Copper: Electrolytic | 14.25* |
| Reduced | 14.25* |
| Lead | 7.50* |
| Manganese: Minus 35 mesh | 64.00 |
| Minus 100 mesh | 70.00 |
| Minus 200 mesh | 75.00 |
| Nickel, unannealed | $1.00 |
| Nickel-Silver, 5000-lb lots | 58.75-61.50† |
| Phosphor-Bronze, ¼-ton lots | 58.50 |
| Silicon | 47.50 |
| Solder | 7.00* |
| Stainless Steel, 302 | 99.00 |
| Stainless Steel, 316 | $1.32 |
| Tin | 14.50* |
| Zinc, 5000-lb lots | 18.75-32.50‡ |
| Tungsten Melting grade, 99% 60 to 200 mesh: | Dollars |
| 1000 lb and over | 4.30 |
| Less than 1000 lb | 4.45 |
| Chromium, electrolytic 99.2% Cr min. | 3.50 |

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

## Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

## SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

| Size—Inches | 2 | | 2½ | | 3 | | 3½ | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | | $1.48 | | $1.92 | |
| Pounds Per Ft | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | | 14.81 | | 19.18 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 6.5 | +10 | 10.5 | +7.25 | 13 | +4.75 | 14.5 | +3.25 | 14.5 | +3.25 | 14 | +3.75 | 16.5 | +1.25 |
| Ambridge, Pa. N2 | 6.5 | .. | 10.5 | ... | 13 | ... | 14.5 | ... | 14.5 | ... | 14 | ... | 16.5 | ... |
| Lorain, O. N3 | 6.5 | +10 | 10.5 | +7.25 | 13 | +4.75 | 14.5 | +3.25 | 14.5 | +3.25 | 14 | +3.75 | 16.5 | +1.25 |
| Youngstown Y1 | 6.5 | +10 | 10.5 | +7.25 | 13 | +4.75 | 14.5 | +3.25 | 14.5 | +3.25 | 14 | +3.75 | 16.5 | +1.25 |

## ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Youngstown R2 | 6.5 | +10 | 10.5 | +7.25 | 13 | +4.75 | 14.5 | +3.25 | 14.5 | +3.25 | 14 | +3.75 | 16.5 | +1.25 |

## BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

| Size—Inches | ⅛ | | ¼ | | ⅜ | | ½ | | ¾ | | 1 | | 1¼ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 5.5c | | 6c | | 6c | | 8.5c | | 11.5c | | 17c | | 23c | |
| Pounds Per Ft | 0.24 | | 0.42 | | 0.57 | | 0.85 | | 1.13 | | 1.68 | | 2.28 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | ... | ... | .... | .... | .... | .... | 18.5 | 1.25 | 21.5 | 5.25 | 24 | 8.75 | 26.5 | 10 |
| Alton, Ill. L1 | ... | ... | .... | .... | .... | .... | 15.5 | +1.75 | 18.5 | 2.25 | 21 | 5.75 | 23.5 | 7 |
| Benwood, W. Va. W10 | 17.5 | +11 | 7 | +16.5 | +0.75 | +25.5 | 18.5 | 1.25 | 21.5 | 5.25 | 24 | 8.75 | 26.5 | 10 |
| Butler, Pa. F6 | 17.5 | +11 | 9 | +16.5 | 0.5 | +24 | ... | ... | ... | ... | ... | ... | ... | ... |
| Etna, Pa. N2 | ... | ... | .... | .... | .... | .... | 18.5 | 1.25 | 21.5 | 5.25 | 24 | 8.75 | 26.5 | 10 |
| Fairless Hills, Pa. N3 | ... | ... | .... | .... | .... | .... | 16.5 | +0.75 | 19.5 | 3.75 | 22 | 6.75 | 24.5 | 8 |
| Fontana, Calif. K1 | ... | ... | .... | .... | .... | .... | 7 | +10.25 | 10 | +6.25 | 12.5 | +2.75 | 15 | +1.5 |
| Ind. Harbor, Ind. Y1 | ... | ... | .... | .... | .... | .... | 17.5 | 0.25 | 20.5 | 4.25 | 23 | 7.75 | 25.5 | 9 |
| Lorain, O. N3 | ... | ... | .... | .... | .... | .... | 18.5 | 1.25 | 21.5 | 5.25 | 24 | 8.75 | 26.5 | 10 |
| Sharon, Pa. S4 | 17.5 | +11 | 9 | +16.5 | 0.5 | +24 | ... | ... | ... | ... | ... | ... | ... | ... |
| Sharon, Pa. M6 | ... | ... | .... | .... | .... | .... | 18.5 | 1.25 | 21.5 | 5.25 | 24 | 8.75 | 26.5 | 10 |
| Sparrows Pt., Md. B2 | 15.5 | +13 | 7 | +18.5 | +1.5 | +28 | 15.5 | +1.75 | 18.5 | 2.25 | 21 | 5.75 | 23.5 | 7 |
| Youngstown R2, Y1 | ... | ... | .... | .... | .... | .... | 18.5 | 1.25 | 21.5 | 5.25 | 24 | 8.75 | 26.5 | 10 |
| Wheatland, Pa. W9 | 17.5 | +11 | 9 | +16.5 | 0.5 | +24 | 17.5 | 0.25 | 20.5 | 4.25 | 23 | 7.75 | 25.5 | 9 |

| Size—Inches | 1½ | | 2 | | 2½ | | 3 | | 3½ | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 27.5c | | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | |
| Pounds Per Ft | 2.73 | | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 27 | 11 | 27.5 | 11.5 | 29 | 11.75 | 29 | 11.75 | .... | .... | .... | .... |
| Alton, Ill. L1 | 24 | 8 | 24.5 | 8.5 | 26 | 8.75 | 26 | 8.75 | .... | .... | .... | .... |
| Benwood, W. Va. W10 | 27 | 11 | 27.5 | 11.5 | 29 | 11.75 | 29 | 11.75 | 19.5 | 1.75 | 19.5 | 1.75 |
| Etna, Pa. N2 | 27 | 11 | 27.5 | 11.5 | 29 | 11.75 | 29 | 11.75 | 19.5 | 1.75 | 19.5 | 1.75 |
| Fairless Hills, Pa. N3 | 25 | 9 | 25.5 | 9.5 | 27 | 9.75 | 27 | 9.75 | 17.5 | +0.25 | 17.5 | +0.25 |
| Fontana, Calif. K1 | 15.5 | +0.5 | 16 | 0 | 17.5 | 0.25 | 17.5 | 0.25 | 8 | +9.75 | 8 | 9.75 |
| Ind. Harbor, Ind. Y1 | 26 | 10 | 26.5 | 10.5 | 28 | 10.75 | 28 | 10.75 | 18.5 | 0.75 | 18.5 | 0.75 |
| Lorain, O. N3 | 27 | 11 | 27.5 | 11.5 | 29 | 11.75 | 29 | 11.75 | .... | .... | .... | .... |
| Sharon, Pa. M6 | 27 | 11 | 27.5 | 11.5 | 29 | 11.75 | 29 | 11.75 | .... | .... | .... | .... |
| Sparrows Pt., Md. B2 | 24 | 8 | 24.5 | 8.5 | 26 | 8.75 | 26 | 8.75 | 16.5 | +1.25 | 16.5 | +1.25 |
| Youngstown R2, Y1 | 27 | 11 | 27.5 | 11.5 | 29 | 11.75 | 29 | 11.75 | 19.5 | 1.75 | 19.5 | 1.75 |
| Wheatland, Pa. W9 | 26 | 10 | 26.5 | 10.5 | 28 | 10.75 | 28 | 10.75 | 18.5 | 0.75 | 18.5 | 0.75 |

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

# Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

| AISI Type | Rerolling Ingots | Rerolling Slabs, Billets | Forging Billets | Seamless Tube Billets | Shapes; H.R. & C.F. H.R. Strip | Bars; Wire | Plates | Sheets | C.R. Strip; Flat Wire |
|---|---|---|---|---|---|---|---|---|---|
| 201 | 17.00 | 21.50 | .... | .... | 31.00 | .... | .... | 42.25 | 39.00 |
| 202 | 18.25 | 24.00 | 31.00 | 36.25 | 33.50 | 36.75 | 38.75 | 42.50 | 42.50 |
| 301 | 17.75 | 22.25 | 31.75 | 36.75 | 32.00 | 38.00 | 40.00 | 44.25 | 41.00 |
| 302 | 19.00 | 24.75 | 32.00 | 37.25 | 34.50 | 38.25 | 40.25 | 44.50 | 44.50 |
| 302B | 20.25 | 26.50 | 33.00 | 37.25 | 37.75 | 38.25 | 40.25 | 47.00 | 47.00 |
| 303 | .... | 26.75 | 34.75 | 40.00 | .... | 41.00 | 42.75 | 52.25 | .... |
| 304 | 20.25 | 26.00 | 33.75 | 39.00 | 37.25 | 40.25 | 43.00 | 47.25 | 47.25 |
| 304L | .... | .... | 38.75 | 44.00 | 42.25 | 45.25 | 48.00 | 52.25 | 52.25 |
| 305 | 21.75 | 28.25 | 35.50 | 39.50 | 40.25 | 40.25 | 43.50 | 50.25 | 50.25 |
| 308 | 22.00 | 29.00 | 38.50 | 44.25 | 41.25 | 45.50 | 49.75 | 52.00 | 52.00 |
| 309 | 29.50 | 38.25 | 46.75 | 53.50 | 53.50 | 54.75 | 58.25 | 67.00 | 67.00 |
| 309S | 31.50 | 41.00 | 51.00 | 59.00 | 58.50 | 60.25 | 63.75 | 74.00 | 74.00 |
| 310 | 37.25 | 48.00 | 62.25 | 72.25 | 68.50 | 73.50 | 75.25 | 78.75 | 78.75 |
| 314 | .... | .... | 62.25 | .... | .... | 73.50 | 75.25 | 81.00 | .... |
| 316 | 31.50 | 40.25 | 51.25 | 59.50 | 58.25 | 60.75 | 64.00 | 68.25 | 68.25 |
| 316L | .... | .... | 56.25 | 64.75 | 63.25 | 65.75 | 69.00 | 73.25 | 73.25 |
| 317 | 37.25 | 48.25 | 62.75 | 72.75 | 73.50 | 74.50 | 77.00 | 83.75 | 83.75 |
| 321 | 25.00 | 32.00 | 38.25 | 44.00 | 44.25 | 45.25 | 49.25 | 54.25 | 54.25 |
| 18-8CbTa | 29.25 | 38.00 | 45.75 | 52.25 | 53.25 | 53.50 | 58.00 | 66.50 | 66.50 |
| 403 | .... | .... | 28.75 | 32.75 | .... | 34.00 | 36.25 | 43.75 | 43.75 |
| 405 | 17.50 | 23.00 | 26.75 | 31.00 | 32.25 | 32.00 | 33.75 | 42.25 | 42.25 |
| 410 | 15.00 | 19.50 | 25.50 | 29.50 | 28.00 | 30.50 | 31.75 | 36.25 | 36.25 |
| 416 | .... | .... | 26.00 | 30.00 | .... | 31.00 | 32.25 | 43.75 | .... |
| 420 | 23.50 | 30.25 | 31.00 | 36.00 | 37.75 | 37.25 | 40.75 | 47.00 | 56.00 |
| 430 | 15.25 | 19.75 | 26.00 | 30.00 | 28.75 | 31.00 | 32.25 | 36.75 | 36.75 |
| 430F | .... | .... | 26.50 | 30.50 | .... | 31.50 | 33.00 | .... | .... |
| 431 | 16.00 | 20.50 | 26.50 | 30.50 | 29.75 | 31.50 | 33.00 | 38.00 | 38.00 |
| 446 | .... | .... | 35.50 | 40.50 | 53.25 | 42.00 | 43.25 | 63.25 | 63.25 |

**Stainless Steel Producers Are:** Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

# Clad Steel

| | Plates, Carbon Base 10% | Plates, Carbon Base 20% | Sheets, Carbon Base 20% |
|---|---|---|---|
| Stainless: | .... | .... | 30.50 |
| 302 | .... | .... | 32.50 |
| 304 | 30.30 | 36.05 | .... |
| 304-L | 32.30 | 37.95 | .... |
| 310 | 41.30 | 47.00 | 47.00 |
| 316 | 35.50 | 41.40 | .... |
| 316-L | 40.00 | 46.10 | .... |
| 316-CB | 41.15 | 48.45 | 37.25 |
| 321 | 32.00 | 37.75 | 48.25 |
| 347 | 34.40 | 41.40 | .... |
| 405 | 25.80 | 33.35 | .... |
| 410 | 25.30 | 32.85 | .... |
| 430 | 25.30 | 32.85 | .... |
| Inconel | 49.45 | 65.45 | .... |
| Nickel | 41.05 | 55.65 | .... |
| Nickel, Low Carbon | 43.25 | 60.05 | .... |
| Monel | 42.35 | 56.35 | 48.00 |
| Copper* | .... | .... | |

| | Strip, Carbon Base, Cold Rolled 10% | Strip, Carbon Base, Cold Rolled Both Sides |
|---|---|---|
| Copper* | 30.00 | 38.00 |

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

# Tool Steel

| Grade | $ per lb | Grade | $ per lb |
|---|---|---|---|
| Regular Carbon | 0.275 | 5%Cr Hot Work | 0.430-0.460 |
| Extra Carbon | 0.330 | W-Cr Hot Work | 0.450 |
| Special Carbon | 0.390 | V-Cr Hot Work | 0.470 |
| Oil Hardening | 0.430 | Hi-Carbon-Cr | 0.770 |

**Grade by Analysis (%)**

| W | Cr | V | Co | Mo | $ per lb |
|---|---|---|---|---|---|
| 20.25 | 4.25 | 1.6 | 12.25 | ... | 4.090 |
| 18.25 | 4.25 | 1 | 4.75 | ... | 2.305-2.475 |
| 18 | 4 | 2 | 9 | ... | 2.675-2.6775 |
| 18 | 4 | 2 | .... | ... | 1.765 |
| 18 | 4 | 1 | .... | ... | 1.600 |
| 13.75 | 3.75 | 2 | 5 | ... | 2.245 |
| 13.5 | 4 | 3 | .... | ... | 1.865 |
| 9 | 3.5 | .. | .... | ... | 1.180 |
| 6 | 4 | 2 | .... | 5 | 1.105 |
| 6 | 4 | 3 | .... | 6 | 1.350 |
| 1.5 | 4 | 1 | .... | 8.5 | 0.960 |

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

# Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

| *Birmingham District* | Basic | No. 2 Foundry | Malle-able | Besse-mer |
|---|---|---|---|---|
| AlabamaCity,Ala. R2 | 54.50 | 55.00‡ | .... | .... |
| Birmingham R2 | 54.50 | 55.00‡ | .... | .... |
| Birmingham U6 | .... | 55.00‡ | 59.00 | .... |
| Woodward,Ala. W15 | 54.50 | 55.00‡ | 59.00 | .... |
| Cincinnati, deld. | .... | 62.70 | .... | .... |
| *Buffalo District* | | | | |
| Buffalo H1, R2 | 58.50 | 59.00 | 59.50 | 60.00 |
| Tonawanda,N.Y. W12 | 58.50 | 59.00 | 59.50 | 60.00 |
| N.Tonawanda,N.Y. T9 | .... | 59.00 | 59.50 | 60.00 |
| Boston, deld. | 69.15 | 69.65 | 70.15 | .... |
| Rochester,N.Y. deld. | 61.52 | 62.02 | 62.52 | .... |
| Syracuse,N.Y. deld. | 62.62 | 63.12 | 63.62 | .... |
| *Chicago District* | | | | |
| Chicago I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Gary,Ind. U5 | 58.50 | .... | 59.00 | .... |
| S.Chicago R2 | 58.50 | .... | 59.00 | .... |
| S.Chicago,Ill. Y1 | 58.50 | 59.00 | 59.00 | 59.50 |
| S.Chicago,Ill. U5, W14 | 58.50 | .... | 59.00 | 59.50 |
| Milwaukee, deld. | 60.67 | 61.17 | 61.17 | 61.67 |
| Muskegon,Mich. deld. | .... | 65.30 | 65.30 | .... |
| *Cleveland District* | | | | |
| Cleveland A7, R2 | 58.50 | 59.00 | 59.00 | 59.50 |
| Akron,O., deld. | 61.25 | 61.75 | 61.75 | 62.25 |
| Lorain,O. N3 | 58.50 | .... | .... | 59.50 |
| *Mid-Atlantic District* | | | | |
| Bethlehem,Pa. B2 | 60.50 | 61.00 | 61.50 | 62.00 |
| NewYork, deld. | .... | 64.78 | 65.28 | .... |
| Newark, deld. | 63.52 | 64.02 | 64.52 | 65.02 |
| Birdsboro,Pa. B10 | 60.50 | 61.00 | 61.50 | 62.00 |
| Chester,Pa. P14 | 60.50 | 61.00 | 61.50 | .... |
| Philadelphia, deld. | 62.16 | 62.66 | 63.16 | .... |
| Steelton,Pa. B2 | 60.50 | 61.00 | 61.50 | 62.00 |
| Swedeland,Pa. A3 | 60.50 | 61.00 | 61.50 | 62.00 |
| Philadelphia, deld. | 62.16 | 62.66 | 63.16 | 63.66 |
| Troy,N.Y. R2 | 60.50 | 61.00 | 61.50 | 62.00 |
| *Pittsburgh District* | | | | |
| NevilleIsland,Pa. P6 | 58.50 | 59.00 | 59.00 | .... |
| Pittsburgh (N&S sides), Aliquippa, deld. | .... | 60.37 | 60.37 | 60.87 |
| McKeesRocks, deld. | .... | 60.04 | 60.04 | 60.54 |
| Lawrenceville,Homestead, Wilmerding, Monaca, deld. | .... | 60.66 | 60.66 | 61.16 |
| Verona,Trafford, deld. | 60.69 | 61.19 | 61.19 | 61.69 |
| Brackenridge, deld. | 60.95 | 61.45 | 61.45 | 61.95 |
| Bessemer,Pa. U5 | 58.50 | .... | 59.00 | 59.50 |
| Clairton,Rankin,S.Duquesne,Pa. U5 | 58.50 | .... | .... | .... |
| McKeesport,Pa. N3 | 58.50 | .... | .... | 59.50 |
| Midland,Pa. C18 | 58.50 | .... | .... | .... |

| *Youngstown District* | Basic | No. 2 Foundry | Malle-able | Besse-mer |
|---|---|---|---|---|
| Hubbard,O. Y1 | .... | .... | 59.00 | .... |
| Sharpsville,Pa. S6 | 58.50 | .... | 59.00 | 59.50 |
| Youngstown Y1 | .... | .... | 59.00 | 59.50 |
| Youngstown U5 | 58.50 | .... | .... | 59.50 |
| Mansfield,O., deld. | 63.40 | .... | 63.90 | 64.40 |
| Duluth I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Erie,Pa. I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Everett,Mass. E1 | 62.00 | 62.50 | 63.00 | .... |
| Fontana,Calif. K1 | 64.50 | 65.00 | .... | .... |
| Geneva,Utah C11 | 58.50 | 59.00 | .... | .... |
| GraniteCity,Ill. G4 | 60.40 | 60.90 | 61.40 | .... |
| Ironton,Utah C11 | 58.50 | 59.00 | .... | .... |
| LoneStar,Texas L6 | .... | 55.00* | .... | .... |
| Minnequa,Colo. C10 | 60.50 | 61.00 | 61.50 | .... |
| Rockwood,Tenn. T3 | .... | 55.00‡ | 59.00 | .... |
| Toledo,O. I-3 | 58.50 | 59.00 | 59.00 | 59.50 |
| Cincinnati, deld. | 64.26 | 64.76 | .... | .... |

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

## PIG IRON DIFFERENTIALS

*Silicon:* Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
*Manganese:* Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
*Nickel:* Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

## BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

| | |
|---|---|
| Jackson,O. G2, J1 | $67.50 |
| Buffalo H1 | 68.75 |

## ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

| | |
|---|---|
| NiagaraFalls, N.Y. P15 | $91.00 |
| Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2) | 95.50 |
| Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2 | 98.50 |

## LOW PHOSPHORUS PIG IRON, Gross Ton

| | |
|---|---|
| Lyles,Tenn. T3 (Phos. 0.035% max) | $72.50 |
| Rockwood,Tenn. T3 (Phos. 0.0035% max) | 72.50 |
| Steelton,Pa. B2 (Phos. 0.035% max) | 66.50 |
| Philadelphia, deld. | 70.05 |
| Troy,N.Y. R2 (Phos. 0.035% max) | 66.50 |
| Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |
| Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |
| Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |
| Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max) | 63.50 |

# Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Buffalo, Chicago, Chattanooga, Cincinnati, Cleveland, Jackson, Milwaukee, St. Louis, 15 cents; Baltimore, Boston, Los Angeles, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, New York, no charge.

| | SHEETS | | | | STRIP | | BARS | | | Standard Structural Shapes | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled | Gal. 10 Ga.† | Stainless Type 302 | H.R.* | C.R.* | H.R. Rds. | C.F. Rds.‡ | H.R. Alloy 4140††* | | Carbon | Floor |
| Atlanta | 7.14 | 8.20 | 8.87 | .... | 7.40 | ... | 7.42 | 9.39 | .... | 7.63 | 7.49 | 9.48 |
| Baltimore | 7.08 | 8.32 | 8.37 | .... | 7.65 | ... | 7.66 | 8.62[3] | 13.44 | 7.93 | 7.21 | 8.87 |
| Birmingham | 6.80 | 7.90 | 8.85 | .... | 7.06 | ... | 7.08 | 9.35 | .... | 7.28 | 6.99 | 9.10 |
| Boston | 7.70 | 8.81 | 10.27 | 45.67 | 7.96 | ... | 7.83 | 9.53 | 14.45 | 8.13 | 7.89 | 9.36 |
| Buffalo | 7.00 | 8.05 | 9.77 | .... | 7.30 | ... | 7.30 | 7.90 | 13.10 | 7.55 | 7.30 | 8.55 |
| Chattanooga | 6.95 | 8.10 | 8.60 | | 7.20 | ... | 7.20 | 9.18 | .... | 7.45 | 7.25 | 9.05 |
| Chicago | 7.00 | 8.24 | 8.65 | 49.05 | 7.21 | ... | 7.27 | 7.75 | 12.85 | 7.43 | 7.14 | 8.61 |
| Cincinnati | 7.12 | 8.23 | 9.05 | 46.10 | 7.45 | ... | 7.51 | 8.05 | 13.09 | 7.90 | 7.43 | 8.86 |
| Cleveland | 7.00 | 8.24 | 8.95 | 49.16 | 7.31 | ... | 7.33 | 7.85 | 12.91 | 7.76 | 7.31 | 8.78 |
| Detroit | 6.99 | 8.28 | 8.78 | 43.50 | 7.34 | ... | 7.36 | 8.04 | 13.05 | 7.75 | 7.27 | 8.65 |
| Erie, Pa. | 6.80 | 7.90 | 8.85 | .... | 7.15 | ... | 7.08 | 7.85 | .... | 7.40 | 7.15 | 8.63 |
| Houston | 7.85 | 8.75 | 10.49 | .... | 8.15 | ... | 8.25 | 9.85 | 14.00 | 8.20 | 7.80 | 9.20 |
| Jackson, Miss. | 7.10 | 8.20 | 9.20 | .... | 7.40 | ... | 7.40 | 9.44 | .... | 7.60 | 7.45 | 9.30 |
| Los Angeles | 8.05 | 10.00 | 11.00 | .... | 8.35 | ... | 8.05 | 10.70 | 14.25 | 8.30 | 8.05 | 10.25 |
| Milwaukee | 7.09 | 8.33 | 8.74 | .... | 7.30 | ... | 7.36 | 7.94 | 12.94 | 7.60 | 7.23 | 8.70 |
| Moline, Ill. | 7.15 | 8.44 | 8.85 | ... | 7.41 | | 7.43 | 8.10 | .... | 7.63 | 7.34 | ... |
| New York | 7.71 | 8.94 | 9.64 | 44.95 | 8.27 | ... | 8.21 | 9.68 | 13.28 | 8.19 | 7.96 | 9.39 |
| Norfolk, Va. | 7.25 | ... | ... | .... | 7.65 | | 7.65 | 9.50 | ... | 7.95 | 7.45 | 8.95 |
| Philadelphia | 7.19 | 8.42 | 9.35 | 45.98 | 7.67 | 9.02 | 7.68 | 8.46 | 13.16 | 7.74 | 7.37 | 8.69** |
| Pittsburgh | 6.80 | 8.09 | 9.20 | 49.00 | 7.16 | | 7.08 | 7.85 | 12.85 | 7.28 | 6.99 | 8.46 |
| Portland, Oreg. | 7.80 | 8.80 | 10.65 | .... | 8.00 | ... | 7.95 | 12.20 | 15.00 | 7.85 | 7.75 | 9.60 |
| Richmond, Va. | 7.00 | ... | 9.47 | .... | 7.65 | ... | 7.70 | 8.85 | ... | 7.95 | 7.20 | 9.10 |
| St. Louis | 7.29 | 8.53 | 9.34 | 43.89 | 7.50 | ... | 7.56 | 8.14 | 13.14 | 7.83 | 7.43 | 8.90 |
| St. Paul | 7.46 | 8.59 | 9.16 | .... | 7.72 | ... | 7.74 | 8.51 | 13.51 | 7.94 | 7.65 | 9.12 |
| San Francisco | 8.10 | 9.65 | 10.15 | 51.65 | 8.35 | ... | 8.05 | 11.20 | 14.25[9] | 8.25 | 8.05 | 10.25 |
| Seattle | 8.55 | 10.40 | 10.80 | 54.00 | 8.65 | ... | 8.40 | 11.70 | 14.65 | 8.30 | 8.20 | 10.10 |
| Spokane | 8.55 | 11.00[1] | 10.80 | .... | 9.05 | ... | 8.35 | 11.80 | 15.35 | 8.30 | 8.20 | 10.60 |
| Washington | 7.50 | 8.79 | 7.97 | .... | 8.12 | ... | 8.08 | 9.09 | .... | 8.40 | 7.68 | 9.34 |

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; ‡‡under ¼-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 6000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [1]—500 to 9999 lb; [2]—400 to 999 lb; [3]—4000 lb and over; [4]—1000 to 1999 lb; [5]—1000 lb and over; [6]—1500 to 3999 lb; [7]—2000 to 3999 lb; [8]—f.o.b. local delivery in lots of 10,000 lb and over.

# 10 TIMES THE PRODUCTION LIFE

## FROM THESE "CAST-TO-SHAPE" SWAGING DIES

**SEND FOR THIS NEW CATALOG**
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The John Deere Plow Works of Deere & Company formerly used cast grey-iron dies to swage AISI 1070 F steel plow beams. Die life was, at best, a mere six weeks or about 8,000 parts.

They switched to A-L CAST-TO-SHAPE swaging dies of FCC No. 66 tool steel, hardened and drawn to 57-58 Rockwell "C". The new dies ran *fourteen months*—eight hours a day, five days a week—before redressing was necessary. Approximately *83,875 Parts* (over ten times the production) were swaged in that period! Production has been maintained at that level since.

You, too, can save time and money with the modern FCC CAST-TO-SHAPE method of tool and die making. Don't forget, you also buy *less* steel and reduce machining costs. It's a matter worth investigating. ● Check with your A-L representative TODAY . . . or write *Allegheny Ludlum Steel Corporation, Oliver Building Pittsburgh 22, Pennsylvania.*

For complete **MODERN** Tooling, call

# Allegheny Ludlum

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FINE TOOL STEELS
SINCE 1854

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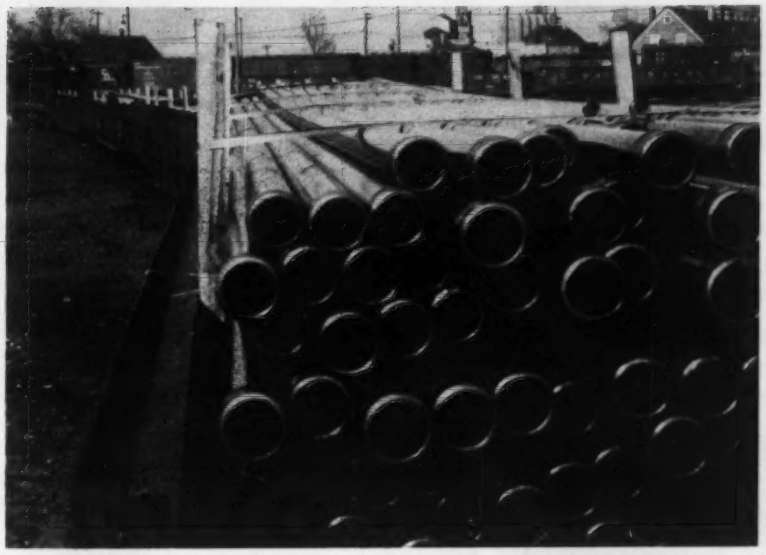

Republic Steel Corp.

*A revolution in carload pipe pricing meets a snag as . . .*

# Jobbers Protest Pipe Policy

A REVOLUTION in the pricing of standard galvanized pipe and line pipe which began in December is meeting with setbacks in January.

National Tube Division, U. S. Steel Corp., last week notified its jobbers that they will be allowed to solicit direct shipment business and get the 5-per-cent discount which the producer withdrew last Dec. 13. But the ban on the "functional" discount for shipments to jobbers' stocks is maintained by all producers. This means there is still a dual-price structure (the bone of contention) with regard to the business of jobbers.

**In the Beginning**—The whole situation arose, according to the producers, because some jobbers were cutting prices to the bone and underbidding on pipe contracts just so they could get the "accessory" business, on which they could make more money. M. W. Dennison, president, Braman, Dow & Co., Boston, a National Tube jobber, in protesting the original action, said: "We deplore the blindness of those who have played fast and loose, but we say that the cure is too drastic and does not have our approval . . . If other mills intend to allow their distributors to continue to solicit direct carload shipments and will give them a functional discount, you have not solved the problem."

Mr. Dennison also expressed the opinion of many jobbers when he said: "For our part, we want to believe that you have no intention to make all direct sales eventually without regard to your warehouse customers. Yet your step to come between us and our carload consumers . . . puts your distributors in a position which we hope they all will protest."

**Sore Spot**—By its action last week, National Tube returned its jobbers to a status virtually equal with jobbers for other producers. But the matter of no discount for shipments to their stocks is still a sore spot.

The historic markup in the pipe business since the late twenties has been 25 to 30 per cent over the consumer's parallel price. Now that the producers have withdrawn the discount, the jobber must boost the price 5 per cent if he is to make the same profit as before. Mr. Dennison claims this will mean a hike of $7.50 a ton on warehouse pipe. The jobbers claim that this exerts an economic pressure for consumers to buy carloads directly from the mills and bypass them. Mr. Dennison questions the advisability of mills charging $100 for pipe going into jobbers' stocks when the same pipe would go for only $95 on jobbers' direct sales to consumers.

**Protest Meeting**—Last week in Chicago, distributors in that area scheduled a meeting for next Thursday to discuss this matter. Another meeting reportedly is being held in Cleveland tomorrow (Tuesday) at which National Tube will explain to its jobbers the reasons for this new policy. National Tube officials could not be reached to confirm or deny this report.

Producers say this new policy is just another logical step in setting up a one-price standard for all steel products. Other mill items have been sold on this basis for some time. Mr. Dennison believes the policy is unrealistic for pipe because "about 50 per cent of merchant pipe is sold to warehouse stock, and, currently, some 20 per cent more through direct carload sales made by distributors."

**More Profit**—Pipe producers claim there was little thought given to the fact that elimination of the discount would mean a bigger profit on the pipe they sell. But they admit that costs have advanced and every little bit helps to balance the books.

As for line pipe, one producer says the new policy is simply a continuation of a long-term trend toward more purchasing of the pipe by the direct consumer. Some line pipe is not sold through jobbers at all.

## Tubular Goods . . .

**Tubular Goods Prices, Page 116**

Demand continues strong for all tubular goods. From all indications, say pipe mill sales managers, this will prove to be heavy volume year in line pipe and oil country goods. Standard pipe business may be off slightly from that placed in 1955, especially should a decline in home building be experienced.

Recent changes in discounts on buttweld standard pipe resulted in no noticeable change in demand, according to the mills.

Cast iron pipe demand is still in a between-season slump. Sales agencies, notably in the Pacific Northwest, expect buying interest to develop soon. Unfavorable weather is a retarding influence in the market.

On the whole, cast iron pipe business this year is expected to be at least equal to that done in 1955, an unusually good year.

## Sheets, Strip . . .

Sheet & Strip Prices, Pages 113 & 114

Some easing in automotive demand at this time may result in a slightly larger tonnage in the second quarter for other sheet consumers. They realize, however, that supply will fall short of what they would like to have.

Sheet producers do not view with alarm reports of a gradual decline in automotive needs. There's no change in shipments from some districts, including Pittsburgh. First effect of lower automotive requirements appeared in reports of fewer emergency requests for tonnage from warehouses and a decline in interest in conversion deals. Sheetmakers believe they won't experience any important change until late second or early third quarter. And then they will welcome the chance to ship larger supplies to other customers.

Several mills will begin their 1956 expansion programs soon. At first they will have to slow down production, making sheet harder to obtain.

Leading sheet sellers believe that by the end of this quarter they will have their arrearages reduced considerably—not by a decline in demand, but because of greater restraint on their part in accepting new tonnage. One leading producer believes that arrearages will be cut to about two weeks on hot and cold-rolled sheets, compared with four to five weeks at the start of this quarter. On galvanized sheets, one leading producer is practically current.

Some producers indicate they will open second quarter books within two or three weeks. One mill plans to start booking tonnage for second quarter on hot and cold-rolled sheets early in February. Demand from stovemakers, cabinet makers and meter manufacturers continues exceedingly brisk.

Untempered spring steel strip has advanced generally $2 a ton. Other increases are in the making. More buying for second quarter delivery will be predicated on the price factor.

## Belgian Steel Bar Price Up

The minimum price for Belgian steel bars exported to the U. S. and Canada has been increased from $102 to $105, f.o.b. Antwerp. Among steel products supplied to North America at prices under those for shipments to other countries were bars, beams and channels. Prices on these products have been raised to remove the differential. Plates and bars used in shipbuilding, for example, now are quoted at $145 and $135, respectively, for any destination. These prices were $135 and $125.

## Steel Bars . . .

Bar Prices, Page 112

Sellers of hot-rolled carbon steel bars may open their books for second quarter business within three weeks. If they follow policy ruling in this quarter, they will accept business for the next contracting period largely on a month-to-month basis.

Most producers appear confident they will have small carry-over at the end of the first quarter—not because of slower demand, but because of the more careful scheduling the last couple of months. Cutbacks in automotive needs may ease supply conditions a little, with the possibility of some spot openings appearing. Most mills think any openings will simply erase a little of the overload which couldn't be handled anyway.

Alloy barmakers have filled most agricultural equipment and lawnmower needs for the 1956 season. They have some open space in their schedules. The pulp and paper industry's alloy bar requirements are reported heavy, and these are taking up some of the slack that has developed in this area of the market.


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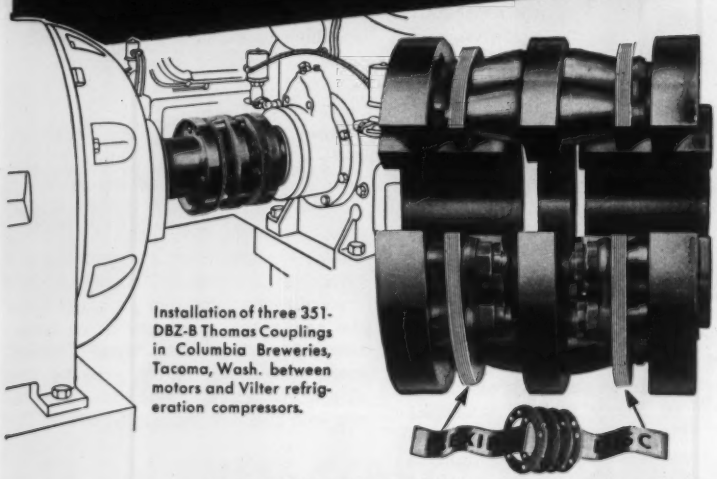
for more years of better service!

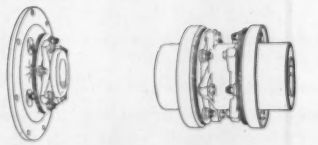


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

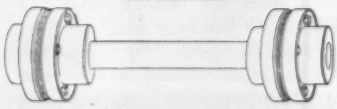
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

| FACTS | EXPLANATION |
|---|---|
| NO MAINTENANCE | Requires No Attention. Visual Inspection While Operating. |
| NO LUBRICATION | No Wearing Parts. Freedom from Shut-downs. |
| NO BACKLASH | No Loose Parts. All Parts Solidly Bolted. |
| CAN NOT "CREATE" THRUST | Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement. |
| PERMANENT TORSIONAL CHARACTERISTICS | Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained. |



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



THOMAS

*Write for our new Engineering Catalog No. 51A*

THOMAS FLEXIBLE COUPLING COMPANY
*Largest Exclusive Coupling Manufacturer in the World*
WARREN, PENNSYLVANIA, U.S.A.

Nickel shortages are holding back production to some extent.

Effective Jan. 10, Bliss & Laughlin Inc. adjusted various extras in its prices for cold-finished carbon steel bars. Advances became necessary because of the recent increase in the cost of hot-rolled carbon bars. Effective Jan. 11, the company announced an adjustment of 35 cents per 100 cwt in the base price of cold-finished steel bars. This amount previously was assessed for standard bar quality, an extra that no longer will be used.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 112

Sellers of reinforcing steel are feeling the impact of the extremely tight situation in structural steel. Extended delivery promises for fabricated structurals are causing many engineers to swtich to reinforced concrete construction on some jobs. This adds to the present tightness in concrete bars and accessories. Not all new business offered can be accepted by the mills. A shortage of cement also serves as a deterrent.

Rolling mill operations are again in full swing in the Pacific Northwest, with prospects bright for continued active demand from building for reinforcing steel. Bar order backlogs in the area are reported off, but much new work is pending. Several changes in size extras were announced recently, but no change was effected in base prices.

## Plates . .

Plate Prices, Page 112

Backlogs of tank fabricators continue to expand. Some shops are booked a year ahead on the basis of plates they can reasonably expect to obtain from mills. While most shops can operate on a single shift, five-day-a-week schedule, many could turn out more tonnage were more plates available.

Demands of the oil and chemical industries are as great as at any time in months. Fabricators of water tanks report demand is well sustained from both industrial and governmental sources.

Tank prices are firming, but, with deliveries extended, the shops still have a pricing problem. This is particularly true with regard to public work on which firm prices are required—instead of those set up on an escalator basis. At least one large fabricator in the East, in quoting firm prices, is allowing for an increase in steel costs of at least $12 a ton after July 1.

Plate mills are making some progress in catching up on tonnage arrearages as result of blankouts and more careful booking of new orders. At least some hope is held that by end of this quarter the mills will be reasonably current with demand. Demand is still far in excess of supply.

Expectations are that plate requirements for roadwork, industrial construction and freight cars will increase. Construction firms are trying to build inventories in advance of their busy season. They are meeting with little success.

Plate fabricators are figuring several sizable projects, including fuel storage facilities, at several Alaskan bases.

## Tool Steel . . .

Tool Steel Prices, Page 116

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 10,615 net tons in November, reports the American Iron & Steel Institute. This was slightly up from the 10,095 tons shipped in the preceding month and was up sharply from the 7158 tons in November, 1954.

Cumulative shipments in the first 11 months of 1955 were 103,752 tons. This compares with 76,679 in the like period of 1954.

Crucible Steel Co. of America in-

. . . To Your Specifications

ERIE Bolts • Studs • Cap Screws • Nuts

In Alloys • Stainless • Carbon • Bronze

Your most exacting specifications take precision form in the hands of our expert craftsmen. Bolts—Studs—Cap Screws—Nuts as specified to resist corrosion, extreme temperatures and tensile stresses are the product of more than 40 years continuous production of highest quality fasteners for a wide diversity of industries.
Send us your specifications for prompt estimate.

ONE OF THE 14 INTEGRATED COMPANIES BARIUM STEEL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives In Principal Cities

# Ores

**Lake Superior Iron Ore**

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

| | |
|---|---|
| Old range bessemer | $11.25 |
| Old range nonbessemer | 11.10 |
| Mesabi bessemer | 11.10 |
| Mesabi nonbessemer | 10.95 |
| Open-hearth lump | 12.10 |

**Eastern Local Iron Ore**

Cents per unit, deld. E. Pa.

| | |
|---|---|
| Foundry and basic 52-62% concentrates contract | 17.00-18.00 |

**Foreign Iron Ore**

Cents per unit, c.i.f. Atlantic ports

| | |
|---|---|
| Swedish basic, 60-68% | 20.00 |
| N. African hematite (spot) | nom. 18.00-20.00 |
| Brazilian iron ore, 68-69% (spot) | 26.00-28.00 |

**Tungsten Ore**

Net ton unit, before duty

| | |
|---|---|
| Foreign, wolframite, good commercial quality | $30.00-$31.00 |
| Domestic, scheelite, mine | 63.00 |

**Manganese Ore**

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

**Chrome Ore**

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for deliver to Portland, Oreg., Tacoma, Wash.

*Indian and African*

| | |
|---|---|
| 48% 2.8:1 | nom. $45.00-$50.00 |
| 48% 3:1 | 42.00-44.00 |
| 48% no ratio | 34.00 |

*South African Transvaal*

| | |
|---|---|
| 44% no ratio | $19.00-$20.00 |
| 48% no ratio | 33.00-35.00 |

*Domestic*

Rail nearest seller

| | |
|---|---|
| 18% 3:1 | $39.00 |

**Molybdenum**

| | |
|---|---|
| Sulphide concentrate, per lb of Mo content, mines, unpacked | $1.00 |

**Antimony Ore**

Per unit of Sb content, c.i.f. seaboard

| | |
|---|---|
| 55-60% | $3.60-$3.85 |
| 60-65% | 3.85-4.00 |

**Vanadium Ore**

Cents per lb $V_2O_5$ content, deld. mills

| | |
|---|---|
| Domestic | 31.00 |

# Refractories

**Fire Clay Brick (per 1000)**

*High-Heat Duty:* Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

*Super-Duty:* St. Louis, $150.

**Silica Brick (per 1000)**

*Standard:* Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

*Super Duty:* Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

**Semisilica Brick (per 1000)**

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

**Ladle Brick (per 1000)**

*Dry Pressed:* Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

**High-Alumina Brick (per 1000)**

*50 Per Cent:* St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

*60 Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa. $248.

*70 Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

**Sleeves (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

**Nozzles (per 1000)**

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

**Runners (per 1000)**

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

**Dolomite (per net ton)**

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

**Magnesite (per net ton)**

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

# Metallurgical Coke

**Price per net ton**

**Beehive Ovens**

| | |
|---|---|
| Connelsville, furnace | $13.75-14.50 |
| Connellsville, foundry | 16.00-17.00 |

**Oven Foundry Coke**

| | |
|---|---|
| Birmingham, ovens | $25.65 |
| Cincinnati, deld. | 30.58 |
| Buffalo, ovens | 27.50 |
| Buffalo, deld. | 28.75 |
| Camden, N. J., ovens | 26.50 |
| Chicago, ovens | 27.00 |
| Cincinnati, deld. | 28.50 |
| Detroit, ovens | 27.50 |
| Detroit, deld. | 28.50 |
| Pontiac, deld. | 29.06 |
| Saginaw, deld. | 30.58 |
| Erie, Pa., ovens | 27.50 |
| Everett, Mass., ovens New England, deld. | *28.55 |
| Indianapolis, ovens | 26.75 |
| Kearny, N. J., ovens | 26.75 |
| Lone Star, Tex., ovens | 19.50 |
| Milwaukee, ovens | 27.50 |
| Neville Island, (Pittsburgh) Pa., ovens | 26.25 |
| Painesville, O., ovens | 27.50 |
| Cleveland, deld. | 29.43 |
| Philadelphia, ovens | 26.50 |
| Portsmouth, O., ovens | 24.75 |
| Cincinnati, deld. | 27.34 |
| St. Paul, ovens | 26.50 |
| Swedeland, Pa., ovens | 26.50 |
| Terre Haute, Ind., ovens | 26.75 |

*Or within $4.55 freight zone from works.

# Coal Chemicals

**Spot, cents per gallon, ovens**

| | |
|---|---|
| Pure benzene | 36.00 |
| Toluene, one deg. | 32.00-34.00 |
| Industrial xylene | 32.00-35.00 |

Per ton, bulk, ovens

| | |
|---|---|
| Ammonium sulphate | $42-$45 |
| Birmingham area | 42.00† |

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

# Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective $CaF_2$ content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

# Electrodes

Threaded with nipple, unboxed, f.o.b. plant

| Diam (Inches) | Length | Per 100 lb |
|---|---|---|
| **GRAPHITE** | | |
| 2 | 24 | $52.50 |
| 2½ | 30 | 33.75 |
| 3 | 40 | 32.00 |
| 4 | 40 | 30.25 |
| 5½ | 40 | 30.00 |
| 6 | 60 | 27.25 |
| 7 | 60 | 26.75 |
| 8, 9, 10 | 60 | 24.25 |
| 12 | 72 | 27.25 |
| 14 | 60 | 23.50 |
| 16 | 72 | 22.50 |
| 17 | 60 | 23.00 |
| 18 | 72 | 22.50 |
| 20 | 72 | 22.25 |
| **CARBON** | | |
| 8 | 60 | 12.10 |
| 10 | 60 | 11.80 |
| 12 | 60 | 11.75 |
| 14 | 60 | 11.70 |
| 14 | 72 | 10.85 |
| 17 | 60 | 10.75 |
| 17 | 72 | 10.35 |
| 20 | 84 | 10.30 |
| 20 | 90 | 10.10 |
| 24 | 72, 84 | 10.30 |
| 24 | 96 | 10.05 |
| 30 | 84 | 10.20 |
| 40, 35 | 110 | 9.90 |
| 40 | 100 | 9.90 |

creased the base price of one of its high-speed steel grades (Rex 7) to 99 cents per pound from 96 cents (effective Jan. 3). This grade is used chiefly for small cutting tools.

## Alloy Steel . . .

Production of alloy steel ingots in November (other than stainless and heat resisting) totaled 845,080 net tons, reports the American Iron & Steel Institute. The bulk of output (652,400 tons) was in the constructional grades. High strength steels accounted for 87,225 tons and silicon sheet steels, 105,455 tons. Of the total output, 819,559 tons were nonboron and 25,521 tons, boron.

In the first 11 months of 1955, output was 8,422,268 tons, of which 8,115,756 tons were nonboron, and 306,512 boron. The bulk of prodution, 6,499,549 was in the constructional specifications; 764,806 tons were high-strength steels; and 1,157,913 tons, silicon sheet steels.

## Wire . . .

**Wire Prices, Pages 114 & 115**

Pressure for valve spring wire has eased slightly. There are no cancellations or heavy shipment deferments, but the urgency for deliveries appears to be easing. This is seen as reflecting some letup in automotive requirements since valve spring wire is usually high in auto needs.

Demand for most grades of finished wire has filled first quarter mill schedules. Producers of high carbon specialties are making little progress toward reducing backlogs. December bookings were in excess of shipments and continue heavy.

Users of highway accessories are alerted for peak demand this spring. Most of them are pressing for steel shipments.

Wire deliveries, in general, continue extended, but the wire mills are more nearly in step with their schedules than are those mills turning out light flat-rolled steel. Carryovers are not so serious a problem in booking new wire orders.

Crucible Steel Co. of America has adjusted base prices on cold-finished stainless steel wire, ½-in. in diameter and under, and on stainless steel hot-rolled wire rods. New extras announced reflect higher finishing costs on cold-finished bars and wire.

Several producers of bright manufacturers wire have announced price increases on bright wire and on wire rods similar to those effected by U. S. Steel Corp. late in December.

Copperweld Steel Co., Glassport,

Pa., is low bidder on 600,000 squares, noncorrosive reinforcing fabric; 10.2 million side-twist wires, and 1.5 million end-twist wires, for the Corps of Engineers, Memphis, Tenn.

## Warehouse . . .

Warehouse Prices, Page 117

Warehouse steel demand continues strong. No change in the tight supply situation is likely to develop during the first half of the year.

Early this month several distributors increased prices on various products 15 to 20 cents per 100 lb. Carbon steel products which increased 15 cents include cold-rolled sheets, galvanized sheets, hot-rolled strip, shapes, plates and floor plates. In most districts, hot-rolled merchant bars advanced 19 cents; hot-rolled sheets, 20 cents. In most districts, hot-rolled special quality bars are priced 53 to 56 cents per 100 lb over merchant bars. Other products appear due for a revision soon.

Charges for delivery were revised. Delivery charges were reduced to 15 cents from 25 cents in Chicago, St. Louis, Cincinnati and Milwaukee; to 15 cents from 30 cents in Cleveland and Buffalo. There is no charge for delivery from warehouses to points in the metropolitan New York area, compared with 10 cents previously.

Fewer emergency requests for sheets are being received by distributors in the Pittsburgh district.

## Rails, Cars . . .

Track Material Prices, Page 115

The second largest freight car order placed in the East in recent years involves 11,200 units for the Pennsylvania Railroad. All cars were placed with the road's own shops, chiefly the Altoona, Pa., works.

## Pig Iron . . .

Pig Iron Prices, Page 117

Pig iron consumers, especially the larger ones, are stepping up their purchases in an effort to beat a possible price increase. Raw materials entering into the production of pig iron have been increasing, along with ferroalloys and various other commodities. A proposed freight rate increase of 7 per cent late next month, if approved by the Interstate Commerce Commission, will have a stimulating effect on costs of all materials.

Prices on foundry grades of scrap are at a high level, making it economically desirable in many instances for foundrymen to increase the pig in their melts.

Foundry operations are increasing steadily toward preholiday levels. Gray iron and malleable shops are operating at about normal capacity.

## Steel Tops 117-Million Mark

Record-breaking production of 117,000,566 net tons of steel in 1955 is reported by the American Iron & Steel Institute. Output exceeded the previous peak, established in 1953, by 5,390,847 tons. The 1954 total was topped by 28,688,914 tons.

The final quarter of 1955, with three consecutive 10-million-ton months, set a record for any quarter. Total output for the period was 31,216,448 tons, compared with 28,577,816 in the preceding three months.

Nearly 59.8 million tons were produced in the last six months of 1955, against 57.2 million in the first half.

In December, the production totaled 10,468,000 tons, a record for that month and comparing with 10,247,398 tons in November, and 8,287,073 in December, 1954.

The institute's preliminary figures showed that steelmaking furnaces were operated at an average of 93 per cent of capacity last year, 98.4 per cent during the fourth quarter and 98.1 per cent in December. In 1955, capacity was rated at 125.8 million tons annually. As of Jan. 1, 1956, it was up to 128,363,090 net tons.

The index of production was 139.7 during 1955, 147.9 during the fourth quarter and 147.1 in December.

| | OPEN HEARTH | | | BESSEMER | | | ELECTRIC | | | TOTAL | | | Calculated weekly | Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Net tons | Per cent of capacity | ‡Index | Net tons | Per cent of capacity | ‡Index | Net tons | Per cent of capacity | ‡Index | Net tons | Per cent of capacity | ‡Index | production (Net tons) | of weeks in month |
| 1955 | | | | | | | | | | | | | | |
| January | 8,054,345 | 86.0 | 125.7 | 199,229 | 49.0 | 56.7 | 584,162 | 63.6 | 163.6 | 8,837,736 | 82.7 | 124.2 | 1,994,974 | 4.43 |
| February | 7,734,884 | 91.5 | 133.7 | 197,091 | 53.7 | 62.1 | 564,959 | 68.1 | 175.1 | 8,496,934 | 88.0 | 132.2 | 2,124,233 | 4.00 |
| March | 9,060,026 | 96.7 | 141.4 | 255,493 | 62.8 | 72.7 | 666,235 | 72.6 | 186.5 | 9,981,754 | 93.4 | 140.3 | 2,253,281 | 4.43 |
| 1st Quarter | 24,849,255 | 91.4 | 133.6 | 651,813 | 55.2 | 63.9 | 1,815,356 | 68.1 | 175.1 | 27,316,424 | 88.0 | 132.3 | 2,124,139 | 12.86 |
| April | 8,858,549 | 97.7 | 142.9 | 275,069 | 69.8 | 80.9 | 681,477 | 76.6 | 197.2 | 9,815,095 | 94.8 | 142.6 | 2,287,901 | 4.29 |
| May | 9,307,291 | 99.4 | 145.3 | 305,347 | 75.1 | 86.9 | 715,678 | 77.9 | 200.4 | 10,328,316 | 96.6 | 145.2 | 2,331,448 | 4.43 |
| June | 8,764,430 | 96.6 | 141.4 | 283,544 | 72.0 | 83.4 | 698,493 | 78.6 | 202.1 | 9,746,467 | 94.1 | 141.6 | 2,271,904 | 4.29 |
| 2nd Quarter | 26,930,270 | 97.9 | 143.2 | 863,960 | 72.3 | 83.8 | 2,095,648 | 77.7 | 199.9 | 29,889,878 | 95.2 | 143.1 | 2,297,454 | 13.01 |
| 1st 6 Months | 51,779,525 | 94.7 | 138.5 | 1,515,773 | 63.8 | 73.9 | 3,911,004 | 72.9 | 187.5 | 57,206,302 | 91.6 | 137.7 | 2,211,299 | 25.87 |
| July | 8,232,535 | 88.1 | 128.5 | 268,348 | 66.1 | 76.4 | 600,063 | 65.5 | 168.0 | 9,100,946 | 85.3 | 127.9 | 2,059,038 | 4.42 |
| August | 8,600,612 | 91.8 | 134.3 | 298,972 | 73.5 | 85.1 | 694,000 | 75.7 | 194.6 | 9,594,545 | 89.7 | 134.9 | 2,165,812 | 4.43 |
| September | 8,829,266 | 97.6 | 142.4 | 307,171 | 78.2 | 90.3 | 745,888 | 84.1 | 215.8 | 9,882,325 | 95.7 | 143.5 | 2,308,954 | 4.28 |
| 3rd Quarter | 25,662,413 | 92.4 | 135.0 | 874,491 | 72.6 | 83.9 | 2,040,912 | 75.0 | 192.5 | 28,577,816 | 90.2 | 135.4 | 2,176,528 | 13.13 |
| 9 Months | 77,441,938 | 93.9 | 137.3 | 2,390,264 | 66.8 | 77.2 | 5,951,916 | 73.6 | 189.2 | 85,784,118 | 91.1 | 136.9 | 2,199,593 | 39.00 |
| October | 9,369,704 | 100.0 | 146.3 | 330,150 | 81.2 | 94.0 | 801,196 | 87.3 | 224.3 | 10,501,050 | 98.2 | 147.6 | 2,370,440 | 4.43 |
| *November | 9,141,244 | 100.8 | 147.5 | 306,674 | 77.9 | 90.2 | 799,480 | 89.9 | 231.3 | 10,247,398 | 99.0 | 148.8 | 2,388,671 | 4.29 |
| †December | 9,390,000 | 100.5 | 146.6 | 292,000 | 72.0 | 83.1 | 786,000 | 85.8 | 220.1 | 10,468,000 | 98.1 | 147.1 | 2,368,000 | 4.42 |
| †4th Quarter | 27,900,948 | 100.0 | 146.8 | 928,824 | 77.0 | 89.1 | 2,386,676 | 87.6 | 225.2 | 31,216,448 | 98.4 | 147.9 | 2,375,681 | 13.14 |
| †Last Half | 53,563,361 | 96.4 | 140.9 | 1,803,315 | 74.8 | 86.5 | 4,427,588 | 81.3 | 208.9 | 59,794,264 | 94.3 | 141.6 | 2,276,143 | 26.27 |
| †Total | 105,342,886 | 95.6 | 139.7 | 3,319,088 | 69.3 | 80.2 | 8,338,592 | 77.2 | 198.3 | 117,000,566 | 93.0 | 139.7 | 2,243,969 | 52.14 |
| 1954 | | | | | | | | | | | | | | |
| January | 7,256,526 | 78.3 | 113.3 | 260,453 | 64.0 | 74.1 | 434,507 | 48.9 | 121.7 | 7,951,486 | 75.3 | 111.8 | 1,794,918 | 4.43 |
| February | 6,523,213 | 77.9 | 112.8 | 174,253 | 47.4 | 54.9 | 385,771 | 48.1 | 119.6 | 7,083,237 | 74.3 | 110.2 | 1,770,809 | 4.00 |
| March | 6,649,667 | 71.7 | 103.8 | 207,726 | 51.1 | 59.1 | 432,207 | 48.7 | 121.0 | 7,289,600 | 69.0 | 102.5 | 1,645,508 | 4.43 |
| 1st Quarter | 20,429,406 | 75.9 | 109.9 | 642,432 | 54.4 | 63.0 | 1,252,485 | 48.6 | 120.8 | 22,324,323 | 72.8 | 108.1 | 1,735,950 | 12.86 |
| April | 6,365,328 | 70.9 | 102.7 | 162,657 | 41.3 | 47.8 | 442,954 | 51.5 | 128.2 | 6,970,937 | 68.1 | 101.3 | 1,624,927 | 4.29 |
| May | 6,817,951 | 73.6 | 106.4 | 198,063 | 48.7 | 56.4 | 456,724 | 51.4 | 127.9 | 7,472,738 | 70.7 | 105.0 | 1,686,848 | 4.43 |
| June | 6,702,006 | 74.7 | 108.1 | 207,666 | 52.7 | 61.1 | 453,962 | 52.8 | 131.3 | 7,363,634 | 72.0 | 107.0 | 1,716,465 | 4.29 |
| 2nd Quarter | 19,885,283 | 73.1 | 105.8 | 568,386 | 47.6 | 55.1 | 1,353,640 | 51.9 | 129.1 | 21,807,309 | 70.3 | 104.4 | 1,676,196 | 13.01 |
| 1st Half | 40,314,689 | 74.5 | 107.8 | 1,210,818 | 51.0 | 59.0 | 2,606,125 | 50.3 | 125.0 | 44,131,632 | 71.5 | 106.2 | 1,705,900 | 25.87 |
| July | 6,040,120 | 65.3 | 94.3 | 205,313 | 50.6 | 58.4 | 382,164 | 43.1 | 107.0 | 6,627,597 | 62.9 | 93.2 | 1,499,456 | 4.42 |
| August | 6,021,496 | 65.0 | 94.0 | 217,837 | 53.6 | 62.0 | 427,574 | 48.2 | 119.7 | 6,666,907 | 63.1 | 93.7 | 1,504,945 | 4.43 |
| September | 6,140,266 | 68.6 | 99.1 | 214,065 | 54.5 | 63.0 | 453,152 | 52.8 | 131.1 | 6,807,483 | 66.7 | 98.9 | 1,590,533 | 4.28 |
| 3rd Quarter | 18,201,882 | 66.3 | 95.8 | 637,215 | 52.9 | 61.1 | 1,262,890 | 48.0 | 119.1 | 20,101,987 | 64.2 | 95.2 | 1,530,997 | 13.13 |
| 9 Months | 58,516,571 | 71.7 | 103.7 | 1,848,033 | 51.6 | 59.7 | 3,869,015 | 49.5 | 123.0 | 64,233,619 | 69.1 | 102.5 | 1,647,016 | 39.00 |
| October | 6,973,568 | 75.2 | 108.9 | 237,754 | 58.5 | 67.7 | 490,211 | 55.2 | 137.3 | 7,701,533 | 72.9 | 108.3 | 1,738,495 | 4.43 |
| November | 7,307,151 | 81.4 | 117.9 | 231,191 | 58.7 | 68.0 | 551,085 | 64.1 | 159.4 | 8,089,427 | 79.1 | 117.5 | 1,885,647 | 4.29 |
| December | 7,530,204 | 81.4 | 117.6 | 231,126 | 57.0 | 65.8 | 525,743 | 59.4 | 147.2 | 8,287,073 | 78.6 | 116.5 | 1,874,903 | 4.42 |
| 4th Quarter | 21,810,923 | 79.3 | 114.7 | 700,071 | 58.0 | 67.1 | 1,567,039 | 59.5 | 147.8 | 24,078,033 | 76.8 | 114.0 | 1,832,423 | 13.14 |
| 2nd Half | 40,012,805 | 72.8 | 105.2 | 1,337,288 | 55.4 | 64.1 | 2,829,929 | 53.8 | 133.5 | 44,180,020 | 70.5 | 104.6 | 1,681,787 | 26.27 |
| Total | 80,327,494 | 73.6 | 106.5 | 2,548,104 | 53.2 | 61.6 | 5,436,054 | 52.0 | 129.3 | 88,311,652 | 71.0 | 105.4 | 1,693,741 | 52.14 |

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.
Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954, as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.
*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

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## Scrap . . .

Scrap Prices, Page 126

**Pittsburgh** — Heavy pressure for scrap in neighboring areas has strengthened No. 1 heavy melting here, but the full effect of price increases in the Valley has not been felt. If a mill attempted to buy No. 1 heavy melting below $54, it would have little success in view of higher prices in the Valley. No higher price than $55 can be maintained here, due to lack of mill demand. Despite rising prices here, reports are spreading that a weakening of prices is beginning.

No. 2 grades enjoy a greater demand here than in the Valley. This leads to a smaller spread between the price of No. 1 and that of No. 2 heavy melting scrap in Pittsburgh. The price of No. 2 grades in Pittsburgh is roughly equivalent to prices quoted in the Valley, but the price of No. 1 grades lags behind Valley prices owing to sparse demand.

**Philadelphia**—Scrap prices generally are steady, with tonnage moving fairly freely. Dealers do not seem to be inclined to hold back to get higher prices. Still, there is no weakness, and with weather a complicating factor, no marked easing may develop for several weeks. The only change noted is a slight advance in couplers, springs and wheels to a flat $60, delivered.

**New York**—Brokers have advanced their buying prices on a number of grades. They are offering $49 to $51 for No. 1 heavy melting and No. 1 bundles, $46 to $47 for No. 2 heavy melting and $40 to $42 for No. 2 bundles. They have boosted buying prices on machine shop turnings to $29 to $30; mixed borings and turnings to $30 to $31; short shovel turnings to $32 to $33; low phos plate to $50 to $52; and unstripped motor blocks to $32 to $33. Brisk demand for export, combined with active domestic requirements, is behind higher prices.

**Cleveland**—The scrap market has reacted sharply from the $62 price paid in the Valley about ten days ago for No. 1 grades of production scrap. Later sales have been made at about $4 under that price. The Valley market now is considered firmly established at $57 to $58 on the No. 1 grades. At Cleveland, No. 1 steel is available at $54 to $55, down from a week ago. The decline accompanies substantial receipts and the drying up of large buying by the mills, which, reportedly, are limiting purchases.

**Buffalo**—Price advances of $1 to $7 a ton swept through the local scrap market last week on new buying which developed after a prolonged period during which new purchases were virtually nil. Steelmaking grades are up $4 a ton on buying by area steel mills of about 15,000 to 20,000 tons. Cast iron scored sharp gains.

**Chicago**—The scrap market here is quiet, with trading at a minimum. But instead of weakness, there is watchful waiting on the part of consumers. In general, prices hold at the level of a week ago. So far this market is not sensitive to the sharp upward surge in the Mahoning valley—and observers doubt that it will be. Local steel mills are considered to have substantial inventories of scrap which serve as a stabilizing influence.

**Detroit**—There have been no above-normal scrap shipments from the Detroit area into the Youngstown district since the recent sharp surge in the Youngstown market in the closing week of 1955.

The jump in price on No. 1 heavy melting steel in the Valley was noted here. But local dealers and brokers are sitting tight in an effort to keep the market under control. As one dealer says: "Right now, everyone is trying to soft pedal the market. There's no great desire to ship out of the Detroit area when you can get $50 a ton right here. At those high prices, $5 or $10 doesn't mean too much."

Dealers feel that efforts to hold the market in line will succeed. There's a strong possibility that the market will break in the next few weeks. If that happens, there may be more shipments into outside areas.

**Cincinnati**—Brokers advanced their

(*Please turn to page* 128)

**Do you save money when you by-pass your distributor?**

See Page No. 20

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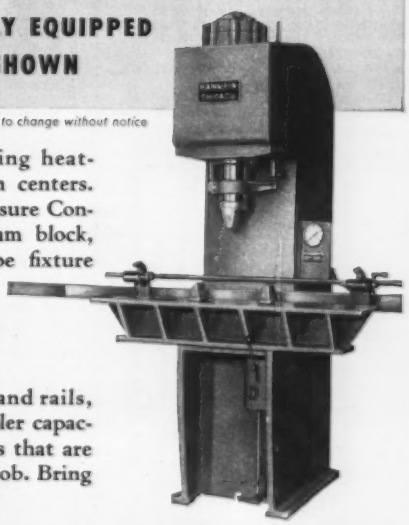

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# Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

## STEELMAKING SCRAP COMPOSITE

| | |
|---|---|
| Jan. 11 | $53.33 |
| Jan. 4 | 52.17 |
| Dec. Avg. | 50.37 |
| Jan. 1955 | 34.95 |
| Jan. 1951 | 46.33 |

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

### PITTSBURGH

| | |
|---|---|
| *No. 1 heavy melting* | *54.00-55.00* |
| *No. 2 heavy melting* | *48.00-49.00* |
| *No. 1 bundles* | *54.00-55.00* |
| *No. 2 bundles* | *44.00-45.00* |
| *No. 1 busheling* | *54.00-55.00* |
| *Machine shop turnings* | *34.00-35.00* |
| *Mixed borings, turnings* | *34.00-35.00* |
| *Short shovel turnings* | *39.00-40.00* |
| *Cast iron borings* | *39.00-40.00* |
| *Cut structurals, 3 ft lengths* | *59.00-60.00* |
| *Heavy turnings* | *46.00-47.00* |
| *Punchings & plate scrap* | *59.00-60.00* |
| *Electric furnace bundles* | *54.00-55.00* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 46.00-47.00 |
| Charging box cast | 44.00-45.00 |
| Heavy breakable cast | 44.00-45.00 |
| Unstripped motor blocks | 32.00-33.00 |
| No. 1 machinery cast | 54.00-55.00 |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt* | *57.00-58.00* |
| Rails, 2 ft and under | 67.00-68.00 |
| Rails, 18 in. and under | 68.00-69.00 |
| Rails, random lengths | 63.00-64.00 |
| Railroad specialties | 59.00-60.00 |

Stainless Steel Scrap

| | |
|---|---|
| 18-8 bundles & solids | 335.00-350.00 |
| 18-8 turnings | 220.00-230.00 |
| 430 bundles & solids | 100.00-110.00 |
| 430 turnings | 60.00-65.00 |

### CLEVELAND

| | |
|---|---|
| No. 1 heavy melting | 54.00-55.00 |
| *No. 2 heavy melting* | *45.00-46.00* |
| No. 1 bundles | 54.00-55.00 |
| No. 2 bundles | 42.00-43.00 |
| No. 2 busheling | 54.00-55.00 |
| Machine shop turning | 30.00-31.00 |
| *Mixed borings, turnings* | *34.50-35.50* |
| *Short shovel turnings* | *34.50-35.50* |
| *Cast iron borings* | *34.50-35.50* |
| Low phos. | 55.00-56.00 |
| *Cut structural plates 2 ft and under* | *61.00-62.00* |
| *Alloy free, short shovel turnings* | *37.00-38.00* |
| Electric furnace bundles | 55.00-56.00 |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *56.00-57.00* |
| Charging box cast | 48.00-49.00 |
| *Stove plate* | *54.00-55.00* |
| *Heavy breakable cast* | *47.00-48.00* |
| Unstripped motor blocks | 38.00-39.00 |
| Brake shoes | 43.00-44.00 |
| Clean auto cast | 55.00-56.00 |
| Burnt cast | 43.00-44.00 |
| *Drop broken machinery* | *56.00-57.00* |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt | 55.00-56.00 |
| R.R. malleable | 59.00-60.00 |
| Rails, 2 ft and under | 71.00-72.00 |
| Rails, 18 in. and under | 72.00-73.00 |
| Rails, random lengths | 65.00-66.00 |
| Cast steel | 60.00-61.00 |
| Railroad specialties | 60.00-61.00 |
| Uncut tires | 60.00-61.00 |
| Angles, splice bars | 66.00-67.00 |
| Rails, rerolling | 71.00-72.00 |

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| *18-8 bundles, solids* | *340.00-350.00* |
| *18-8 turnings* | *200.00-210.00* |
| *430 clips, bundles, solids* | *105.00-115.00* |
| *430 turnings* | *55.00-65.00* |

### YOUNGSTOWN

| | |
|---|---|
| *No. 1 heavy melting* | *58.00-59.00* |
| No. 2 heavy melting | 48.00-49.00 |
| No. 1 bundles | 57.00-58.00 |
| *No. 2 bundles* | *44.00-45.00* |
| No. 1 busheling | 57.00-58.00 |
| *Machine shop turnings* | *32.50-33.50* |
| *Short shovel turnings* | *36.50-37.50* |
| *Cast iron borings* | *36.50-37.50* |
| *Low phos.* | *59.00-60.00* |
| *Electric furnace bundles* | *59.00-60.00* |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 57.00-58.00 |

### CHICAGO

| | |
|---|---|
| No. 1 heavy melting | 49.00-52.00 |
| *No. 2 heavy melting* | *40.00-41.00* |
| *No. 1 factory bundles* | *52.00-53.00* |
| *No. 1 dealer bundles* | *50.00-51.00* |
| No. 2 bundles | 40.00-41.00 |
| No. 1 busheling | 49.00-52.00 |
| Machine shop turnings | 31.00-32.00 |
| Mixed borings, turnings | 33.00-34.00 |
| Short shovel turnings | 33.00-34.00 |
| Cast iron borings | 33.00-34.00 |
| Cut structurals, 3 ft | 56.00-57.00 |
| Punchings & plate scrap | 57.00-58.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 51.00-52.00 |
| Stove plate | 43.00-44.00 |
| Unstripped motor blocks | 40.00-41.00 |
| Clean auto cast | 56.00-57.00 |
| Drop broken machinery | 56.00-57.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 54.00-55.00 |
| *R.R. malleable* | *64.00-65.00* |
| Rails, 2 ft and under | 69.00-70.00 |
| Rails, 18 in. and under | 70.00-71.00 |
| Angles, splice bars | 67.00-68.00 |
| Rails, rerolling | 72.00-73.00 |

Stainless Steel Scrap

| | |
|---|---|
| 18-8 bundles & solids | 335.00-350.00 |
| 18-8 turnings | 240.00-250.00 |
| 430 bundles & solids | 110.00-115.00 |
| 430 turnings | 50.00-55.00 |

### DETROIT

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| *No. 1 heavy melting* | *50.00* |
| *No. 2 heavy melting* | *50.00* |
| *No. 1 bundles* | *50.00* |
| *No. 2 bundles* | *36.00* |
| *No. 1 busheling* | *50.00* |
| Machine shop turnings | 23.00 |
| Mixed borings, turnings | 23.00 |
| Short shovel turnings | 27.00 |
| Punchings & plate scrap | 55.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 43.00 |
| Charging box cast | 37.00 |
| Stove plate | 37.00 |
| Heavy breakable | 35.00 |
| Unstripped motor blocks | 25.00 |
| Clean auto cast | 46.00 |
| Malleable | 42.00 |

### BIRMINGHAM

| | |
|---|---|
| No. 1 heavy melting | 45.00-46.00 |
| No. 2 heavy melting | 42.00-43.00 |
| No. 1 bundles | 45.00-46.00 |
| No. 2 bundles | 34.00-35.00 |
| No. 1 busheling | 45.00-46.00 |
| Cast iron borings | 19.00-20.00 |
| Short shovel turnings | 30.00-31.00 |
| Machine shop turnings | 29.00-30.00 |
| Electric furnace bundles | 48.00-49.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 47.50-48.00 |
| Stove plate | 44.50-45.50 |
| Bar crops and plate | 54.00-55.00 |
| *Structural & plate, 2 ft* | *54.00-55.00* |
| Unstripped motor blocks | 39.00-40.00 |
| *Charging box cast* | *32.00-33.00* |
| *No. 1 wheels* | *39.00-40.00* |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 51.00-52.00 |
| Rails, 18-in. and under | 64.00-65.00 |
| Rails, rerolling | 64.00-65.00 |
| Rails, random lengths | 59.00-60.00 |
| Angles, splice bars | 61.00-62.00 |

### PHILADELPHIA

| | |
|---|---|
| No. 1 heavy melting | 55.00 |
| No. 2 heavy melting | 49.00 |
| No. 1 bundles | 55.00 |
| No. 2 bundles | 46.00 |
| No. 1 busheling | 55.00 |
| *Electric furnace bundles* | *56.00* |
| Machine shop turnings | 38.00 |
| Mixed borings, turnings | 38.00 |
| Short shovel turnings | 40.00 |
| Heavy turnings | 51.00 |
| Structurals & plate | 58.00-60.00 |
| *Couplers, springs, wheels* | *60.00* |
| Rail crops, 2 ft & under | 67.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 51.00-53.00 |
| Malleable | 66.00 |
| Heavy breakable cast | 54.00 |
| Drop broken machinery | 57.00-58.00 |

### NEW YORK

(Brokers' buying prices)

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *46.00-47.00* |
| *No. 1 bundles* | *49.00-50.00* |
| *No. 2 bundles* | *40.00-42.00* |
| *Machine shop turnings* | *29.00-30.00* |
| *Mixed borings, turnings* | *30.00-31.00* |
| *Short shovel turnings* | *32.00-33.00* |
| *Low phos. (structural & plate)* | *50.00-52.00* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 47.00-48.00 |
| *Unstripped motor blocks* | *32.00-33.00* |
| Heavy breakable | 46.00-47.00 |

Stainless Steel

| | |
|---|---|
| 18-8 sheets, clips solids | 320.00-325.00 |
| 18-8 borings, turnings | 150.00-160.00 |
| 430 sheets, clips, solids | 120.00-125.00 |
| 410 sheets, clips, solids | 100.00-105.00 |

### BOSTON

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 47.00-47.50 |
| No. 2 heavy melting | 39.00-40.00 |
| No. 1 bundles | 46.00-47.00 |
| No. 2 bundles | 36.50-37.50 |
| Machine shop turnings | 26.50-27.50 |
| Mixed borings, turnings | 27.50-28.00 |
| *Short shovel turnings* | *29.00-29.50* |
| No. 1 cast | 45.00-45.50 |
| Mixed cupola cast | 42.00-42.50 |
| No. 1 machinery cast | 47.00-47.50 |

### BUFFALO

| | |
|---|---|
| *No. 1 heavy melting* | *47.00-48.00* |
| *No. 2 heavy melting* | *43.00-44.00* |
| *No. 1 bundles* | *47.00-48.00* |
| *No. 2 bundles* | *40.00-41.00* |
| *No. 1 busheling* | *47.00-48.00* |
| *Mixed borings, turnings* | *33.00-34.00* |
| *Machine shop turnings* | *31.00-32.00* |
| *Short shovel turnings* | *35.00-36.00* |
| *Cast iron borings* | *35.00-36.00* |
| *Low phos.* | *49.00-50.00* |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| *No. 1 cupola* | *47.00-48.00* |
| *No. 1 machinery* | *50.00-51.00* |

Railroad Scrap

| | |
|---|---|
| *Rails, random lengths* | *58.00-59.00* |
| *Rails, 3 ft and under* | *60.00-61.00* |
| *Railroad specialties* | *51.00-52.00* |

### CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| *No. 1 heavy melting* | *49.00-50.00* |
| *No. 2 heavy melting* | *42.00-43.00* |
| *No. 1 bundles* | *49.00-50.00* |
| *No. 2 bundles* | *40.00-41.00* |
| *No. 1 busheling* | *49.00-50.00* |
| *Machine shop turnings* | *34.00-35.00* |
| *Mixed borings, turnings* | *30.00-31.00* |
| *Short shovel turnings* | *36.00-37.00* |
| *Cast iron borings* | *30.00-31.00* |
| *Low phos., 18 in.* | *58.00-59.00* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *47.00-48.00* |
| *Heavy breakable cast* | *45.00-46.00* |
| *Charging box cast* | *45.00-46.00* |
| *Drop broken machinery* | *56.00-57.00* |

Railroad Scrap

| | |
|---|---|
| *No. 1 R.R. heavy melt* | *55.00-56.00* |
| *Rails, 18 in. and under* | *68.00-69.00* |
| *Rails, random lengths* | *61.00-62.00* |

### ST. LOUIS

(Brokers' buying prices)

| | |
|---|---|
| *No. 1 heavy melting* | *41.50-44.50* |
| *No. 2 heavy melting* | *39.00-41.00* |
| *No. 1 bundles* | *43.00-44.50* |
| *No. 2 bundles* | *35.00-37.50* |
| Machine shop turnings | 28.00 |
| Short shovel turnings | 28.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 47.00 |
| *Charging box cast* | *44.00* |
| *Heavy breakable cast* | *42.00* |
| *Unstripped motor blocks* | *42.00* |
| *Brake shoes* | *44.00* |
| *Clean auto cast* | *48.00* |
| Stove plate | 41.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 55.50 |
| Rails, 18 in. and under | 67.00 |
| Rails, random lengths | 65.00 |
| Rails, rerolling | 71.00 |
| Angles, splice bars | 63.00 |

### SEATTLE

| | |
|---|---|
| No. 1 heavy melting | 48.00 |
| No. 2 heavy melting | 44.00 |
| No. 1 bundles | 40.00 |
| No. 2 bundles | 38.00 |
| No. 3 bundles | 25.00 |
| Machine shop turnings | 15.00-16.00 |
| Mixed borings, turnings | 15.00-16.00 |
| Short shovel turnings | 15.00-16.00 |
| Electric furnace, No. 1 | 55.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 50.00 |
| Heavy breakable cast | 40.00 |
| No. 1 wheels | 35.00 |
| Unstripped motor blocks | 33.00 |
| Clean motor blocks | 40.00 |
| Stove plate (f.o.b. plant) | 35.00 |
| Brake shoes | 35.00 |

Railroad Scrap

| | |
|---|---|
| Rails, random lengths | 33.00 |

### LOS ANGELES

| | |
|---|---|
| No. 1 heavy melting | 39.00 |
| No. 2 heavy melting | 37.00 |
| No. 1 bundles | 39.00 |
| No. 2 bundles | 33.00 |
| Machine shop turnings | 18.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| No. 1 cupola | 48.00 |

### SAN FRANCISCO

| | |
|---|---|
| *No. 1 heavy melting* | *44.00* |
| *No. 2 heavy melting* | *42.00* |
| *No. 1 bundles* | *44.00* |
| *No. 2 bundles* | *38.00* |
| *No. 1 busheling* | *44.00* |
| *Machine shop turnings* | *23.00* |
| *Mixed borings, turnings* | *23.00* |
| *Cast iron borings* | *23.00* |
| *Short shovel turnings* | *25.00* |
| *Cut structurals* | *46.00* |
| *Heavy turnings* | *25.00* |
| *Punchings & plate scrap* | *44.00* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 50.00 |
| Charging box cast | 35.00 |
| Stove plate | 39.00 |
| Heavy breakable cast | 36.00 |
| Unstripped motor blocks | 32.00 |
| Brake shoes | 35.00 |
| Clean auto cast | 50.00 |
| No. 1 wheels | 39.00 |
| Burnt cast | 23.00 |
| Drop broken machinery | 50.00 |

### HAMILTON, ONT.

| | |
|---|---|
| No. 1 heavy melting | 43.50 |
| No. 2 heavy melting | 39.50 |
| No. 1 bundles | 43.50 |
| No. 2 bundles | 36.00 |
| Mixed steel scrap | 36.00 |
| Mixed borings, turnings | 17.00 |
| Rails, remelting | 52.50 |
| Busheling, new factory: Prepared | 41.50 |
| Unprepared | 37.50 |
| Short steel turnings | 21.00 |

Cast Iron Grades†

| | |
|---|---|
| No. 1 machinery cast | 42.00-45.00 |

†F.o.b., shipping point.

# A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

(*Concluded from page* 125)

buying prices on No. 1 heavy melting steel $2.50 a ton to $49.50. They expect a further rise. A local mill has not entered the market, but prices are being strengthened by activity elsewhere.

**St. Louis**—Brokers' buying prices took a sharp upsurge as a result of higher price schedules put into effect Jan. 4 by the two major mills in this area, Granite City Steel and Laclede Steel. The increases ranged from $3 on No. 1 heavy melting to $1 on various cast iron grades. No. 2 heavy melting and bundles, as well as virtually all cast iron grades, showed a notable boost.

There is not enough local scrap to supply the two mills. They were losing No. 1 heavy melting and some bundles to other districts.

**Birmingham**—While some buying is reported, the market is quiet for the most part. One large consumer of open-hearth material was forced to halt incoming shipments temporarily because they were coming in too rapidly to handle. Some dealers think further price advances are in prospect. They are accepting orders for only limited quantities. Others are shipping material from their yards as quickly as possible. Yard receipts are substantial.

**Los Angeles**—District mills are increasing their purchases of the No. 1 grades of scrap, but demand for other grades is off from a year ago. Prices in the area are holding at levels recently established.

**San Francisco**—Steel scrap prices have moved up another $1 to $4 a ton all along the line, with the top grades commanding $44. Some categories are quoted at all-time highs. Consumption is running at a high level, and there has been some delay in shipments from northern California, recently hit by floods.

**Seattle**—The higher prices recently effected in this market are being maintained. Strength is attributed to a combination of heavy domestic consumption, active exporting and a decline in receipts due to unfavorable weather at interior points which hampers collections.

## Canada . . .

Dominion Foundries & Steel Ltd., Hamilton, Ont., increased prices on two products (effective Jan. 3). Hot-rolled plates are up $10 per short ton to $107 and hot-rolled sheets, $5 to $95. The increases were attributed to higher scrap prices—now $15 a ton above those quoted at this time a year ago.

## Structural Shapes . . .

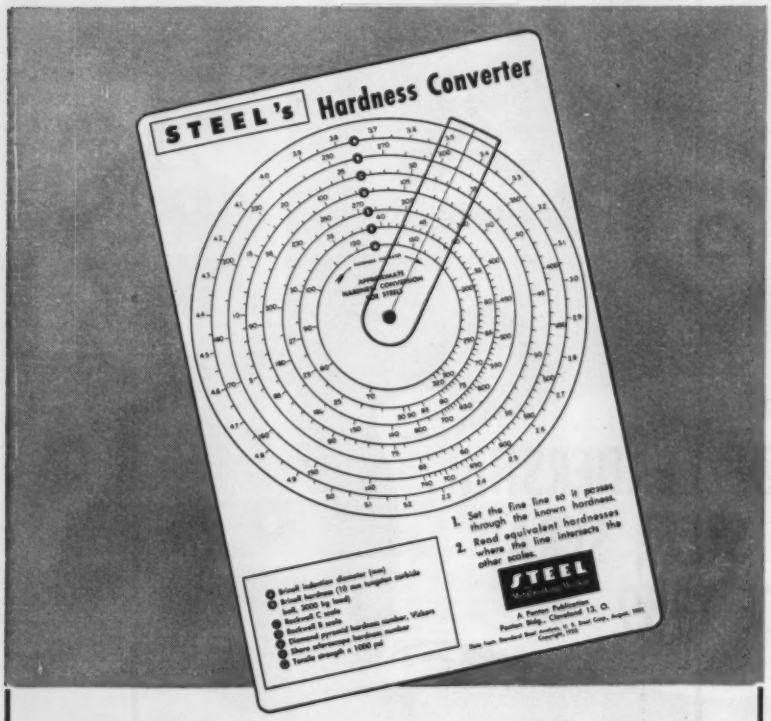
**Structural Shape Prices, Page 112**

The proposed $100-million Palace of Progress building atop the Pennsylvania station in New York has been abandoned in favor of a plan to spend $300 million to $500 million on the redevelopment of a 40-acre area on the west side of Manhattan, according to William Zeckendorf, president, Webb & Knapp Inc., real estate operators that are promoting the project.

The development, as planned, will run from Ninth Ave., between 30th and 35th streets, to the Hudson river, with an extension north between Eleventh Ave. and the Hudson river, running to 38th street.

Mr. Zeckendorf said the development would be the city's most important center of commerce, recreation and communication. There will be ten buildings with a total of 12 million sq ft. A tower rising 1750 ft above a central plaza would serve as an observation point for defense and other activities.

The program has been submitted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**(2) Read equivalent hardness where the line intersects the other scales.**

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| 30 — 49 | .28 |
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STEEL

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Cleveland 13, O.

to city officials for approval.

This spectacular project will require thousands of tons of structurals when, and if, it gets under way. It is only one of many proposals that promise to enliven the structural steel market well into the future.

Current structural inquiry continues heavy. Booked well ahead, fabricators are figuring new work selectively. The larger shops are booked up anywhere from 8 to 12 months. Road and bridge construction is outstanding, but public utility work also is prominent along the eastern seaboard.

Bridge contracts placed in New England by mid-January approximate 10,000 tons, exclusive of an 11,000-ton span at Bridgeport, Conn. Contractors are placing bridge steel for fabrication promptly after jobs are awarded. Several that delayed, shopping for better prices, find deliveries moved out several months while they were dickering for bargains unsuccessfully. Heavy tonnage contract deliveries extend ten months and into 1957 in some instances.

Shapemakers are still in arrears on deliveries—a month and longer in some cases. Wide flange beams will continue hard to obtain during second quarter when many construction firms will be trying to acquire steel for specific building projects.

Fabricators in the Pacific Northwest, contrary to the situation in the East, are actively seeking new work. Their backlogs were low at year end. Pending tonnages in the area are reported larger than normal and several sizable awards are scheduled for early action.

Los Angeles city and county construction volume for 1956 will approach $500 million, a new construction record for that area.

Midwestern fabricators are booked solidly through the first half of the year, and they anticipate full order books for the last half. Big highway programs scheduled in the area are the basis for this expectation. A year ago, leading fabricators were able to promise delivery in four to five months. Today, promises run a full year and longer.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

2660 tons, approach work, Patapsco tunnel, contract TT-103, Baltimore, through Buckley & Co. Inc., Philadelphia, to Harris Structural Steel Co., New York.

2000 tons, south wing, Riverside church, Riverside drive and 119th street, New York, to Harris Structural Steel Co., New York.

300 tons, addition to pumping facilities, Han-


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Furnaces & Plating Equipment Complete—Like New Immediate Delivery.

G.E. ROLLER HEARTH 465 KW, 1650 deg. F, 5' wide, 18" high, 20' long & 40' cooling.

G.E. ROLLER HEARTH gas fired, rad. tube, 5' wide, 18" high, 18' long & 40' cooling.

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4000 CFH. EXO GEN. w/each above furn.

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500 C.F.H. Westinghouse Endothermic Gen.

SURF. COMB. GAS BOX, 30" wide, 18" high, 36" long, 1800 deg. F.

SURF. COMB. GAS BOX, 4' 6" wide, 12' long, 30" high, 1850 deg. F.

2,000 ft. Mechanical Handling System No. 458 Chain with trolley & clevice assemblies.

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Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Displayed classified rates on request

Address your copy and instructions to

**STEEL**

Penton Building Cleveland 13, Ohio

ford Works, to Isaacson Iron Works, Seattle; Morrison-Knudsen Co. Inc., Seattle, general contractor.

300 tons, manufacturing building and warehouse, R. T. French Co., Souderton, Pa., to Easton Steel Structures, Easton, Pa.

115 tons, state bridge, Berks county, Pa., to A. B. Roth & Co., Lancaster, Pa.

### STRUCTURAL STEEL PENDING

9000 tons, municipal power plant, Memphis, Tenn.; bids asked.

2105 tons, 15 bridges, Connecticut turnpike, East Haven-Branford, Conn., project 319-01; bids to Hartford, Conn.; also 1335 tons, concrete reinforcing bars; 890 tons, steel piles and 500 tons of mat reinforcing.

1850 tons, 12 grade separation structures, Connecticut turnpike, Branford-Guilford, Conn., project 320-01; also 800 tons of concrete reinforcing bars and 135 tons of steel piles.

1440 tons, five nose wing hangars, Elmendorf Air Base, Alaska, to Baker-Ford Co., Bellingham, Wash., low at $3,418,110.

900 tons, section, Brooklyn-Queens expressway, New York, bids asked; plans available through the office of the Borough of Queens.

710 tons, angles, channels and plain beams, grade M, medium; bids Jan. 18, Air Force Base, Topeka, Kans., contracting officer.

500 tons, County-City building, Tacoma, Wash., 10-story, $6-million project; bids to Pierce county commissioners, Feb. 14.

435 tons, three bridges and culverts, Fall River-Boston expressway, Brockton-Avon-Stoughton, Mass., section; S. & M. Co., Inc., Providence, R. I., low on general contract; also 270 tons of concrete reinforcing bars.

335 tons, Eagle Gorge dam railroad relocation, Seattle; general contract to Morrison-Knudsen Co. Inc., Seattle, at $2,083,754 to the U. S. Engineer.

100 tons, military projects, Elmendorf Air Base, Alaska; general contracts placed.

Unstated, hoists, controls, etc.; Gorge high dam, Skagit project; bids to Seattle Feb. 7.

## REINFORCING BARS . . .

### REINFORCING BARS PENDING

400 tons, Eielson Air Base, Alaska, installation; general contracts awarded.

100 tons or more, packaging and warehouse buildings, Sick's Brewing & Malting Co., Seattle; bids in Jan. 12.

Unstated, addition to YMCA building, Salem, Oreg.; general contract to Vieski & Post, Salem, low at $397,075.

Unstated, Oregon road projects, general contracts awarded: Lane county, tunnel, to Gibbons & Reed, Portland, Oreg., low at $616,641; Nehalem river bridge, Workman & Wilson, Canby, $124,720; 39th Ave. overcrossing, Portland expressway, to Lord Bros., Portland, Oreg., low at $294,444.

## PLATES . . .

### PLATES PENDING

4110 tons, government furnished; also 54 tons of sheet piling, Ice Harbor lock and dam, Snake river; bids to U. S. Engineer, Walla Walla, Wash., Feb. 16; Schedule No. 56-40.

1615 tons, hull plates, medium grade; bids Jan. 18, Air Force Base, Topeka, Kans., contracting officer.

170 tons, fuel storage tank, Oxnard Air Force Base; bids Jan. 18, Corps of Engineers, Los Angeles.

170 tons, two 5000-bbl fuel storage tanks, naval air station, Brunswick, Ga.; bids Jan. 31, Sixth Naval District, Charleston, S. C.

Unstated, 3175 ft of sheet steel piling, proposed terminal bulkhead near Pasco, Wash., Snake river; permit applied for.

Unstated, fuel storage facilities, Elmendorf Air Base, Alaska; general award to Pacific Alaska Contractors Inc., Tacoma, Wash., low at $671,421.

## PIPE . . .

### CAST IRON PIPE PENDING

1195 tons, 8 and 24 in., Latham Water District, Colonie, N. Y.; bids Jan. 26, contractor's letting.

550 tons, 12 and 16 in., Arlington county, Va.

50 tons, various sizes; bids in at Clackamas, Oreg.

## RAILS, CARS . . .

### LOCOMOTIVES PLACED

Denver & Rio Grande Western, twelve 1750-hp diesel-electric road switching units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Union Pacific, twenty-five 1000-hp diesel-electric switching units to Alco Products Inc., New York.

### RAILROAD CARS PLACED

Chicago & North Western, 1201 boxcars to the Pullman-Standard Car Mfg. Co., Chicago.

Detroit & Toledo Shore Line, 100 fifty-ton steel boxcars to General American Transportation Corp., Chicago.

Pennsylvania, 11,200 freight cars to own shops; mostly, if not all, to Altoona, Pa. List comprises 5500 hoppers, 3300 boxcars, 1700 gondolas and 700 flatcars.

Reading, 1000 fifty-five-ton hoppers and 500 seventy-ton hoppers to Bethlehem Steel Co., Bethlehem, Pa.; these are in addition to 1400 placed since Nov. 1 and reported previously.

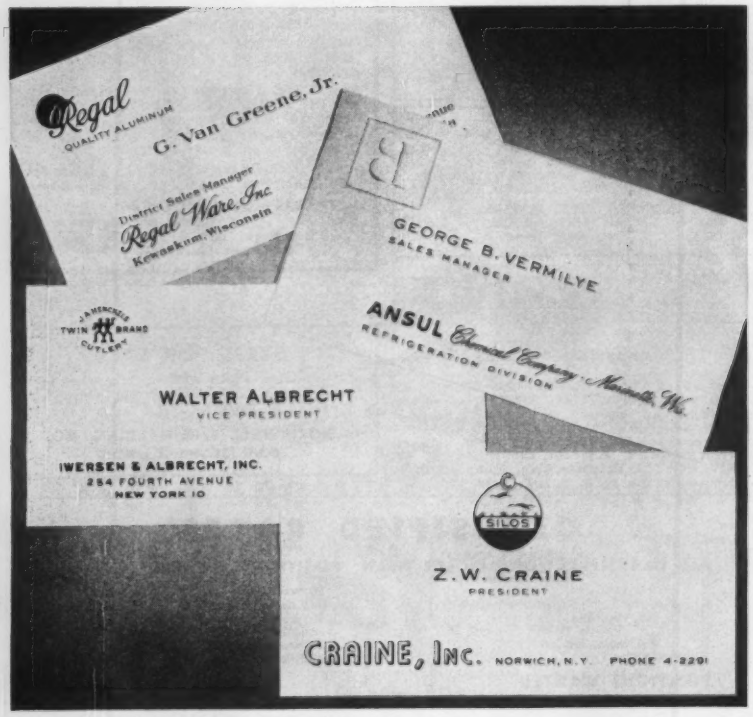
Southern Railway, 246 cars, with 225 fifty-ton boxcars and 6 seventy-ton hoppers going to the Pullman-Standard Car Mfg. Co., Chicago, and 15 ninety-ton depressed center flatcars to the Thrall Car Mfg. Co.

St. Louis-South Western, 950 freight cars, with 700 fifty-ton boxcars going to the Pullman-Standard Car Mfg. Co., Chicago, 200 seventy-ton fixed-end gondolas to the Bethlehem Steel Co., Bethlehem, Pa., and 50 fifty-ton flatcars to the Greenville Steel Car Co., Greenville, Pa.

### RAILS PENDING

Missouri Pacific, 30,660 tons.


BRING YOUR
BUSINESS CARDS
UP TO DATE!




For 98 years Wiggins business cards have served American industry. Times and styles change and so do the designs of cards. An inquiry on your letterhead with one of your present cards will bring samples and suggestions.

THE JOHN B. WIGGINS COMPANY
*Distinctive Engraving Since 1857*
638 South Federal Street, Dept. S., Chicago 5, Illinois

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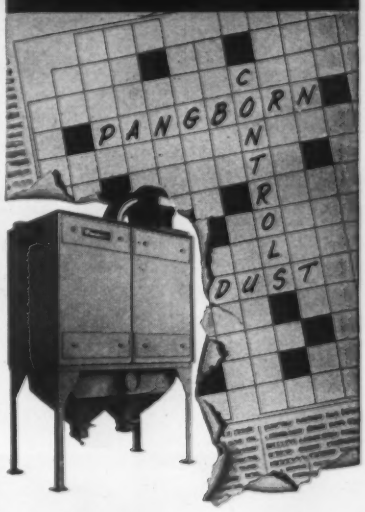
**PUZZLED by a dust problem?**




**Pangborn can solve it for you!**

Pangborn Unit Dust Collectors give thorough, efficient dust control at any individual operation. Requiring little floor space, they can be located anywhere. Use the Pangborn Dust Collector to:

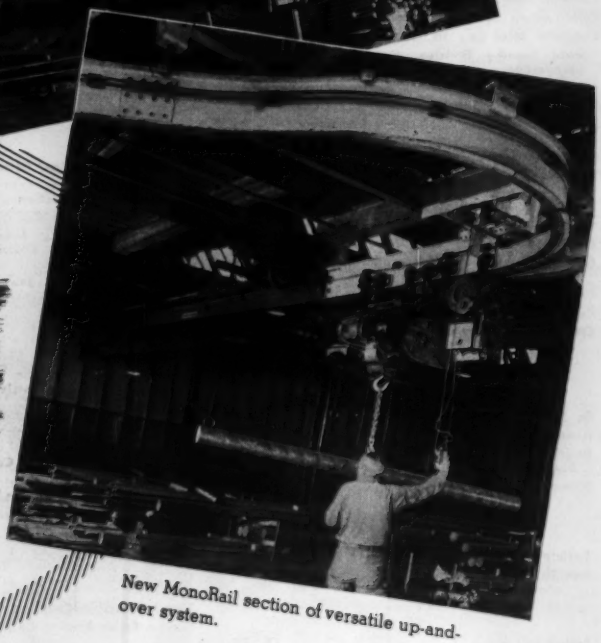
- **Reclaim valuable material**
- **Reduce dust damage to expensive machinery and finished products**
- **Cut plant housekeeping costs**
- **Speed production — improve working conditions**

Investigate Pangborn Unit Dust Collectors now! Shipped assembled... $545 and up. For details, write to: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

**Pangborn**
**CONTROLS DUST**

Three existing craneways permit maximum use of floor area.

# new MONORAIL ties into old ... for flexible system



New MonoRail section of versatile up-and-over system.

A newly engineered section was added to three existing MonoRail craneways in this bar stock warehouse. As a result, incoming material can be picked up from a car and transported on this highly efficient overhead system to storage area. When the raw stock is needed, this up-and-over system has it there on schedule. If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you answer it.

**Member of Materials Handling Institute - MonoRail Association**

*Photos courtesy of Super Steels, Inc., Chicago, Ill.*

AMERICAN OVERHEAD HANDLING EQUIPMENT **MONORAIL** COMPANY

13102 ATHENS AVENUE
CLEVELAND 7, OHIO

*Fill all your*

**COLD ROLLED SPECIALTY STEEL**

*needs at Crucible*

You'll find, at Crucible, dozens of *prescription-made* cold rolled steels designed for special applications . . . steels for automotive stampings, business machine parts, saw blades, cutting dies, skates, springs and cutlery – to name just a few.

You'll find them in the widest possible variety – including carbon spring, alloy and stainless steels – in fact, in *any* ferrous analysis that can be cold rolled. And you're *sure* of *quality* at Crucible – the nation's leading producer of *special purpose steels* – for Crucible maintains *complete* control of production from ore to finished steel.

So when you need prompt delivery of *any* kind of cold rolled specialty steel *call Crucible*. Experienced Crucible metallurgists can help, too, in selecting the *best* steels for your job. And write for your free copy of Crucible's new 32-page booklet on cold rolled specialty steels. It's packed with useful data. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

**CRUCIBLE** first name in special purpose steels

**Crucible Steel Company of America**

# TIMKEN® bearings ended lubrication headaches on this hot mill 29 years ago

WHEN Wheeling Steel purchased this hot-strip mill in 1927, they specified Timken® tapered roller bearings for the roll necks on the work rolls and back-up rolls. These bearings have given extremely satisfactory service for the past 29 years while using economically applied, low-cost grease for bearing lubrication.

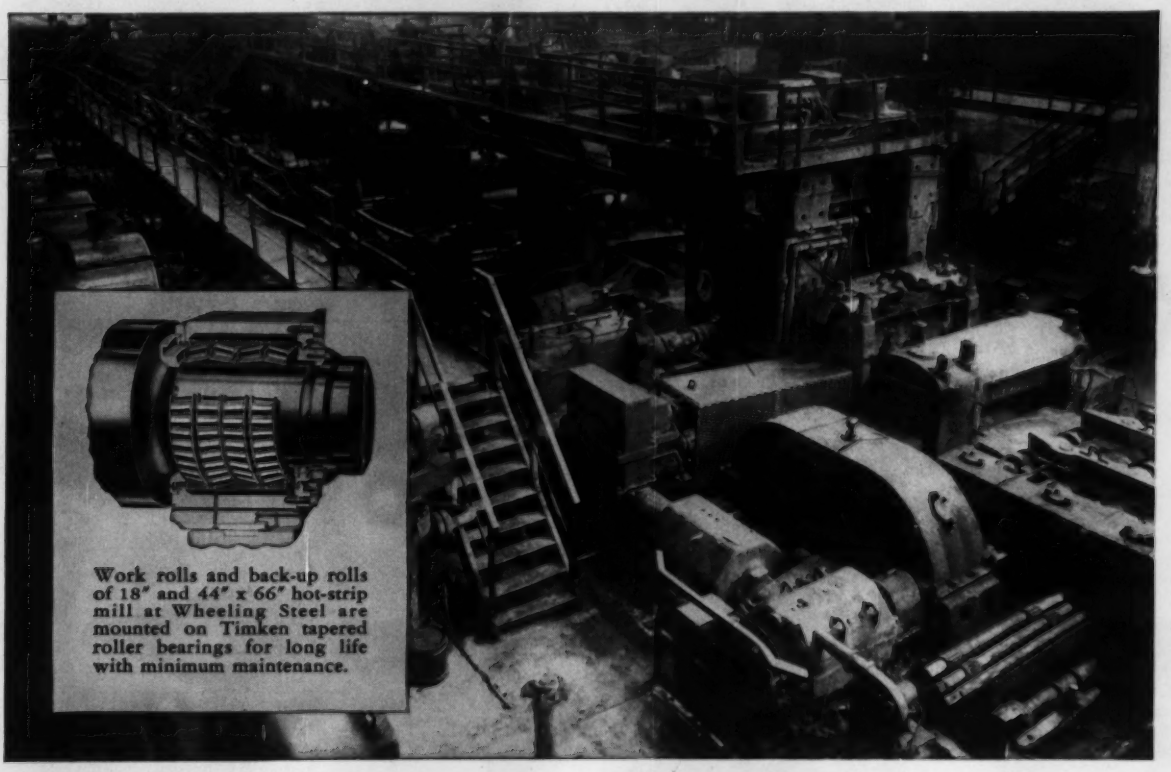
Their experience with grease-lubricated Timken bearings proves that there's no loss of lubricant during roll changes. Moreover, rolls can be changed in less time. And Timken bearings make closures more effective and reduce loss of lubricant because they keep the roll neck concentric with its chock.

Using Timken bearings will simplify mill designs all around. No special thrust units are needed because Timken bearings take both radial and thrust loads in any combination.

Timken bearings have exceptionally low frictional resistance—the result of true rolling motion based on proper geometric design and precision manufacture. This low friction reduces starting resistance and permits mills to accelerate more rapidly. Higher mill speeds are possible. Skidding or scuffing between work roll and back-up roll is reduced.

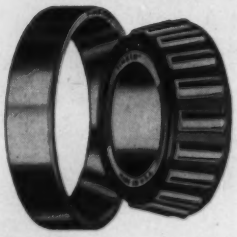
Timken bearings can be applied to machinery of any type to make it run better and last longer. Look for the trade-mark "Timken" on the bearings in the machines you buy or build. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*





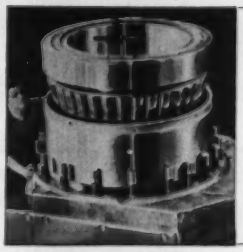
Work rolls and back-up rolls of 18" and 44" x 66" hot-strip mill at Wheeling Steel are mounted on Timken tapered roller bearings for long life with minimum maintenance.



**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

*TAPERED ROLLER BEARINGS*



**ROLL NECK BEARING ENGINEERING SERVICE**

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←